~~Part XII.~~ Vol: 1.– Price 2 Rs.

THE FERNS

OF

BRITISH INDIA,

I

Being Figures and Descriptions of Ferns

FROM ALL PARTS OF BRITISH INDIA

(EXCLUSIVE OF THOSE FIGURED IN "THE FERNS OF SOUTHERN INDIA AND CEYLON,")

BY

CAPTAIN R. H. BEDDOME,

OFFICIATING CONSERVATOR OF FORESTS.

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1866.

MISSOURI BOTANICAL GARDEN LIBRARY

POLYPODIEÆ.

* *Veins free.*

NOTHOCHLÆNA. *R. Brown Prod. Fl. N. Holl.* 145.

(Cincinalis, *Desvaux* ;—Argyrochosma, *J. Sm.* ;—Eriochosma, *J. Sm.* ;—Lepicosma, *J. Sm.* ;—)

Gen. char. *Sori* non-indusiate, small, rotundate, oligocarpous, contiguous, becoming laterally confluent into a narrow line or border, *the receptacles* terminal. *Veins* simple or forked from a central costa. *Venules* free.

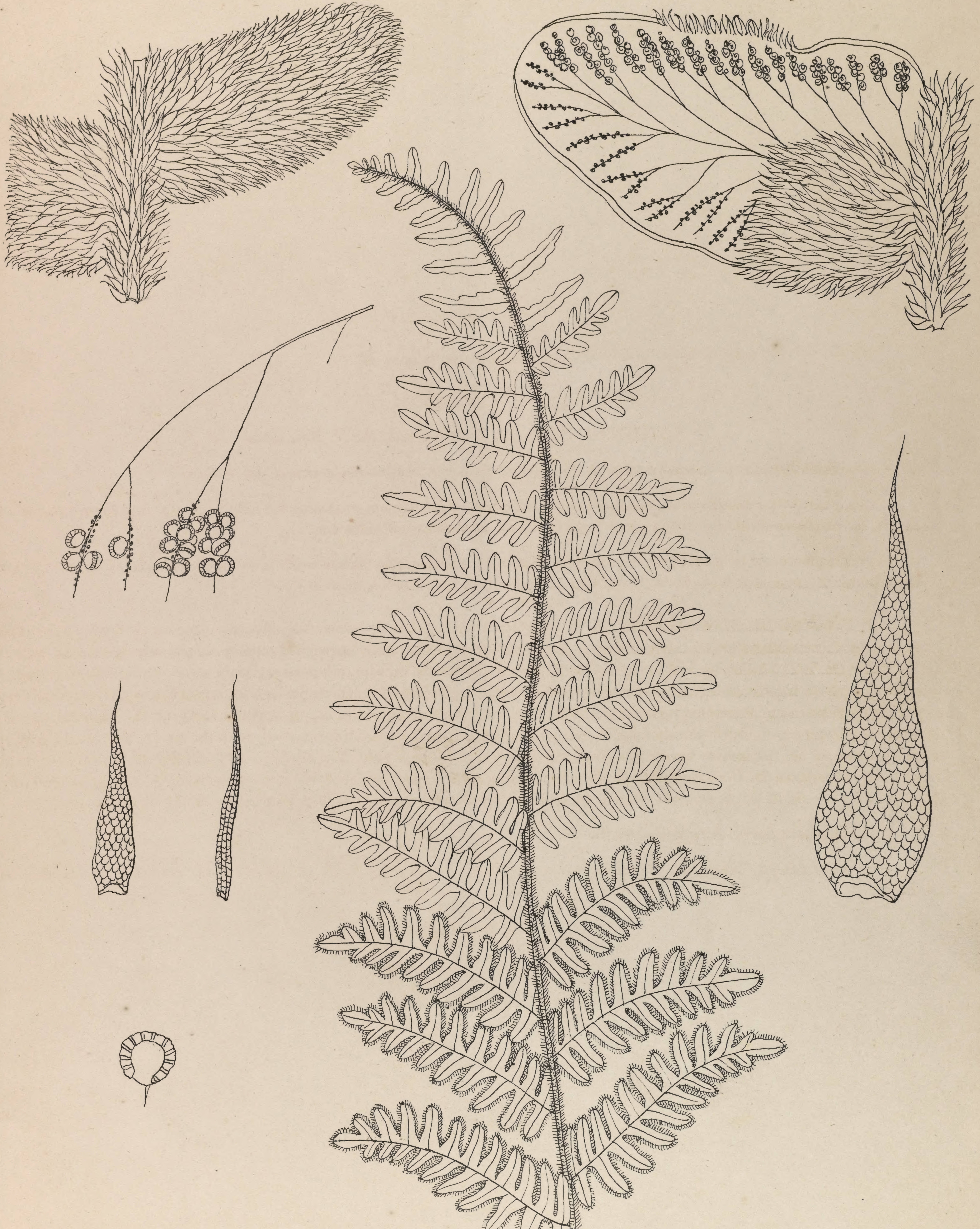
Fronds pinnate, bi-tri-pinnate, the margins sometimes with a tendency to become revolute and indusioid. Rhizome short, erect, or decumbent. *A genus with the habit of Cheilanthes, but without an indusium.* (Moore.)

1. NOTHOCHLÆNA MARANTÆ (Br.) Caudex a stout horizontal rhizome, densely paleaceous with soft silky ferruginous finely pointed subulate scales, stipites generally stout purplish-black 3-6 inches long, aggregated setosely and densely hirsute, as well as the rachis, fronds 4-5-10 inches long, 2-2½ inches wide, oblongo-lanceolate, carnoso-coriaceous, glabrous above, beneath densely clothed with ferruginous oblongo-lanceolate imbricated scales bi-pinnate, primary pinnæ petiolate or sessile from a broadish obtuse base oblongo-acuminate, pinnules not numerous approximate sessile 2-3 lines long, very obtuse entire, upper ones confluent at the base (as are the terminal primary pinnæ) the edge scarcely reflexed, sori forming a broad border extending some way from the margin towards the costule, much concealed by the paleaceous covering.—*Hook. Sp. Fil.* v. 120 ;—*Br. Prodr. Nov, Holl. p.* 146 ;—*Desv. Webb. Fl. Canar.* iii. *p.* 455 ;—N. subcordata, *Desv.* ;—Acrostichum Marantæ, *Linn. Sp. Pl. p.* 1527 ;—*Schk. Fil. t.* 4 ;—*Sw. Syn. Fil. p.* 14 ;—*Willd. Sp. Pl.* v. *p.* 122 ;—*Sibth. Fl. Gr. t.* 964 ;—Ceterach, *De Cand.* ;—Gymnogramme, *Metten.* ;—A. Canariense, *Willd. Sp. Pl.* v. *p.* 121.

The specimen figured is from near Simla.

Hab. South of Europe, N. Africa and adjacent islands, Abyssinia, N. W. India, Kumaon, Kumalari, Simla, Sikkim, Bhotan.

PLATE No. I.



Nothochlæna Marantæ. (R.Br.)

Govindoo del. G. Winchester lithr. Madras.

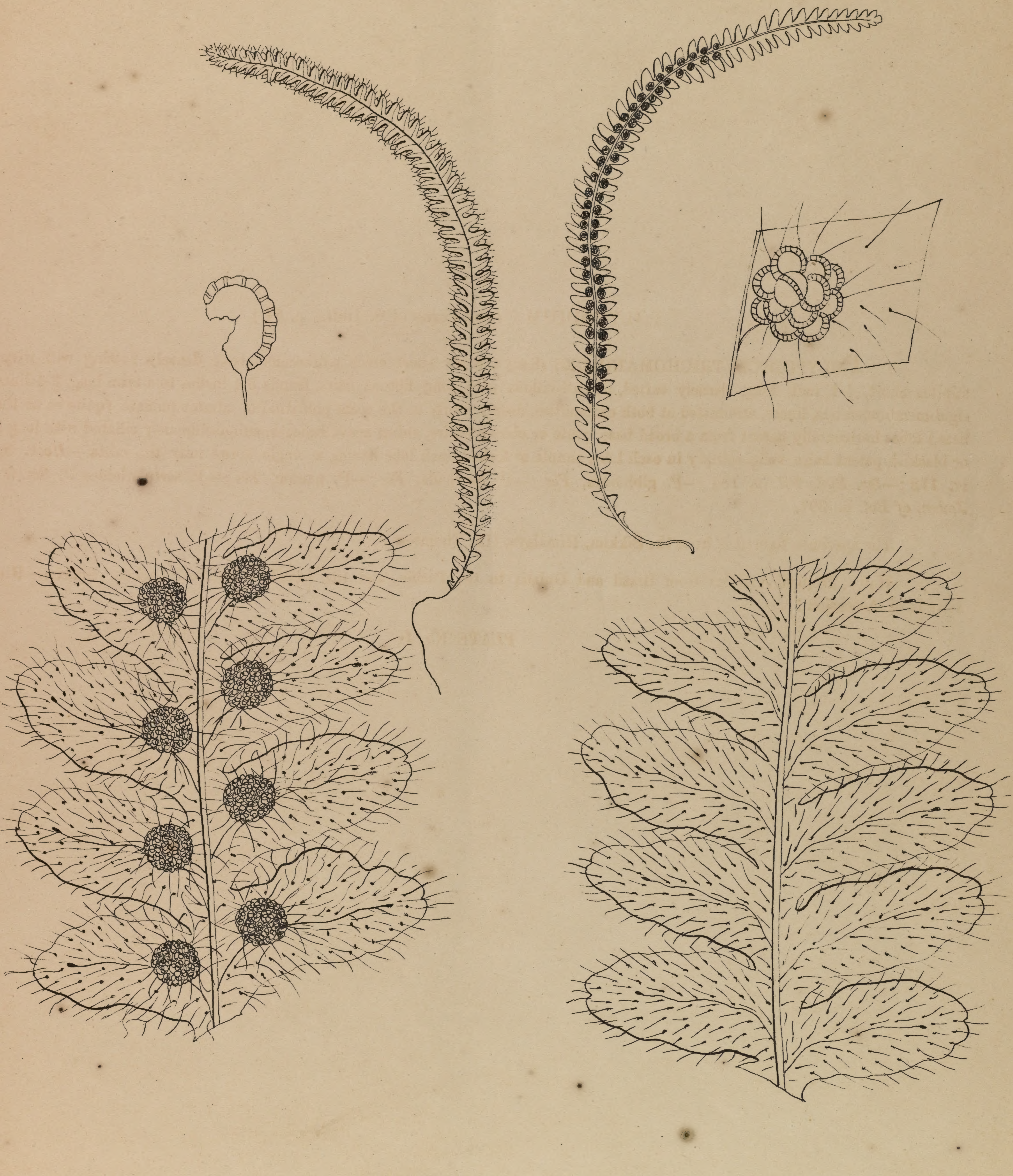
POLYPODIUM. (See Ferns of S. India, p. 54.)

1. POLYPODIUM TRICHOMANOIDES (Sw.) Caudex short erect paleaceous above densely rooting with wiry fibres, stipites short, ½-1 inch long, densely tufted, patenti-villous with long fibrous hairs, fronds 3-4 inches to a span long, 2-4 lines wide rigid-membranaceous, linear, attenuated at both extremities, deeply nearly to the costa pinnatifid or almost pinnate (quite so at the very base,) lobes horizontally patent from a broad base, ovate or oblong entire, sub-concave beneath, sub-deciduously ciliated with long fibrous or blackish patent hairs, veins solitary in each lobe, simple or forked, each lobe having a single sorus near the costa.—*Hook. Sp. Fil.* iv. 178;—*Sw. Syn. Fil. p.* 184;—P. gibbosum, *Fée.*;—P. Serricula, *Fée*;—P. nanum, *Fée*;—P. sertularioides, *J. Sm. in Hook. Journ. of Bot.* iii. 394.

The specimen figured is from the Sikkim, Himalaya, (Dr. Thomson.)

Hab. Tropical America from Brazil and Guiana to the Pacific, and the Islands,—Malacca, Lachen, Sikkim—Himalaya, Islands of Ascension ?

PLATE No. II



Polypodium trichomanoides
(Sw.)

Govindoo del. G. Winchester lith. Madras.

GONIOPTERIS. (See Ferns of S. India, p. 57.)

1. GONIOPTERIS LINEATA (Coleb.) Stipes $1\frac{1}{2}$ foot and more long rather stout, scaleless, glossy, and as well as the rachis strongly tinged with red (rarely stramineous) fronds 1-2-3 feet long, broad-oblong or lanceolate, coriaceo-submembranaceous, pinnated, glabrous, pinnæ numerous rather distant patent sessile 5-8 inches long, $\frac{1}{2}$ an inch or little more broad (on sterile fronds sometimes exceeding an inch) from an obliquely cuneato-truncate sessile base, (lower ones rather more attenuated and subpetiolate) lanceolate or elongato-oblong, finely acuminated at the apex, the margin coarsely and sharply submucronato-serrated, serratures pointing a little forward uniform, costæ prominent beneath of the same colour as the rachis and stipes generally reddish, veinlets about 8-14 pairs often alternate, of which all are connivent except 2-3 short pairs in the teeth of the serratures, sori in 2 series on the middle of the veinlets.—*Hook. Sp. Fil.* v. 12 ;—*Colebr. in Herb. Wall., and Wall. Cat. n.* 300 ;—P. costatum, *Wall. Herb.* (*not* Goniopteris costata *of Brack.*)

The specimen figured is from Birmah (Captain the Honorable J. Dormer.) my specimen given to him. C.P.

Hab. Nepaul, Kumaon, Simla, Nimhlow, Silhet, Mishmee, Ceylon ?

PLATE No. III.

Goniopteris lineata (Coleb:)

Govindoo del.

G. Winchester lith. Madras.

POLYPODIEÆ.

* * * *Veins reticulated without free included veinlets.*

DICTYOPTERIS. *Presl. Tent. Pterid.* 194.

(Dictymia, *J. Smith* ;—Polypodii sp., *Auct.* ;—Drynariæ sp., *Fée.* ;—Aspidii sp., *Blume* ;—Phegopteridis sp., *Mettenius.*)

Gen. char. *Sori* non-indusiate, globose or oblong, compital, *i. e.,* the *receptacles* uniting several radiating reticulated veinlets, or medial. *Veins* uniformly reticulated (or sub-pinnately branched) from a central costa, the areoles elongated, oblique, without free included veinlets.

Fronds coriaceous or sub-coriaceous, simple or bi-pinnate. Sori sometimes marginally serial. Rhizome creeping (? always).

The nearly uniform venation, without included free veinlets, distinguishes this genus. (Moore.)

1. DICTYOPTERIS TENERIFRONS (Hook.) Caudex small creeping underground scaleless with very few radicles, stipites few, remote, slender, glossy, stramineous, the base very tomentose with a few sparse scales partly subterraneous, attached to the caudex by a small point, fronds thin, membranaceous pale-green, glabrous subpuberulous on the veins, 6-9 inches long, quite as broad as long, cordato-deltoid subternate or pinnated with 3-9 sub-falcate pinnæ, lateral ones nearly opposite petiolate lowest pair half-ovate, acuminate 4-6 inches long, lobato-pinnatifid, those of the superior margin with broad ovate nearly equal subdenticulate, blunt lobes, the inferior ones much elongated and acuminated, the basal ones again lobato-pinnatifid, intermediate pinnæ ovato-lanceolate pinnatifid, terminal pinna long petiolate broad-ovate acuminate deeply pinnatifid especially at the base, veinlets uniformly reticulated, areoles with no included free veinlets, costular areoles large, sori rather irregularly scattered, dorsal or compital. *Hook. Sp. Fil.* v. 104.

The specimen figured is from Moulmein (Rev. C. S. P. Parish).

Hab. W. Trop. Africa, Luzon, Moulmein.

PLATE No. IV.

Dictyopteris Aenerifrons
(Hook)

Govindoo del.

G. Winchester del & lith. Madras.

POLYPODIEÆ.

* * * *Veins reticulated with free included veinlets.*

† *Free veinlets excurrent.*

GONIOPHLEBIUM. *Blume. Fl. Jav.* 132.

(Marginaria, *Presl.* (non-*Bory.*) ;—Synammia, *Presl.* in part ;—Pleurogonium, *Presl.* ;—Lepicystis, *J. Smith* in part ;—Lopholepis, *J. Smith* ;—Schellolepis, *J. Smith* ;—Crypsinus, *Presl.* ;—Craspedaria, *Link in part : Fée.* ;—Polypodii sp., *Auct.* ;—Grammitidis sp., *Desvaux* ;—Campyloneuri sp., *Auct.* ;—Acrostichi sp., *Langsdorff et Fischer* ;—Mecosori sp., *Klotzsch.*)

Gen. char. *Sori* non-indusiate, globose (rarely oblong) ; the *receptacles* punctiform (rarely oblong,) situated at the apex of the lower anterior venules, or of the simple excurrent free veinlets, one being included within each areole. *Veins* forked or pinnate from a central costa ; the lower anterior *venules* usually free and fertile, the rest angularly or arcuately anastomosing (in one or more, frequently several series), and producing from their angles free excurrent *veinlets* which are often fertile ; the marginal veinlets free.

Fronds simple, pinnatifid, or pinnate, herbaceous or coriaceous, sometimes scaly, the fertile often much narrower. Sori transversely uni-bi-or tri-serial, sometimes squamiferous ; Rhizome creeping, the fronds articulated. (Moore).

1. GONIOPHLEBIUM AMÆNUM (Wall.) Caudex creeping, densely paleaceous, with ferruginous subulate scales, stipites a span to a foot or more long, stramineous or brown, fronds 1 to nearly 2 feet long, 6-10 inches wide, glabrous or sub-pubescent, ovate terminating in a lanceolate acuminate sub-entire segment, deeply pinnatifid to within 2-3 lines of the costa, segments horizontal more or less approximate 3-6-8 inches long, $\frac{1}{4}$-$\frac{1}{3}$ an inch wide, sub-falcate from a broad base, ensiform gradually acuminate, entire, or coarsely dentato-serrate, lowest pair deflexed, veins forming one costal series of moderately sized soriferous areoles, and sometimes two (the second not soriferous), marginal veinlets free, soriferous veinlet always arising from the vein at a distance from the costa, sori sub-globose sunk) (papillose on the upper side.)—*Hook. Sp. Fil.* v. 24 ;—*Wall. Cat. n.* 290 ;—*Metten. Polyp. p.* 80 ;—Marginaria, *Pr.* ;—Goniophlebium, *J. Sm.*

The specimen figured is from Dalhousie (Captain Dyas).

Hab. Nepaul, Khasya, Bhotan, Kumaon (alt. 6,000 to 10,000 feet), Mussoorie, Dalhousie.

PLATE No. V.

Goniophlebium amœnum.
(Wall.)

Govindoo del.

G. Winchester lith. Madras.

2. GONIOPHLEBIUM ARGUTUM (Wall.) Caudex thick as a writing-quill, squarrose with subulate blackish or brown glossy scales, stipites 3-4 inches to a span long, testaceous-brown glossy, fronds firm-membranaceous, glabrous, 1-2 feet long, 8-10 inches broad, pinnated, pinnæ distant, sub-horizontally patent, 4-6 inches long, $\frac{1}{2}$-$\frac{3}{4}$ inch wide from a broader, but obtusely and oblique cuneated or sub-truncated base (rarely rotundato-auricled), elongato-oblong, acuminate, rather obtusely serrated, lower ones often opposite, the rest alternate, superior ones more or less adnate and decurrent, terminal one similar to the rest, veins forming a costal series of large oblong soriferous areoles, marginal veins ending in a thickened apex within the margin all free, sori-orbicular, superficial at the apex of the free veins in the costal areoles. *Hook. Sp. Fil.* v. 32. *Wall. Cat. n.* 308.

The specimen figured is from Nynee Tal (Mr. Oldham.)

Hab. Nepaul, Kumaon, Nynee Tal, Sikkim, Khasya, Gowhatty Plains.

PLATE No. VI.

Goniophlebium argutum (Wall.)

Govindoo del.

G. Winchester del. & lith. Madras.

PLEOPELTIS. (See Ferns of Southern India, p. 57.

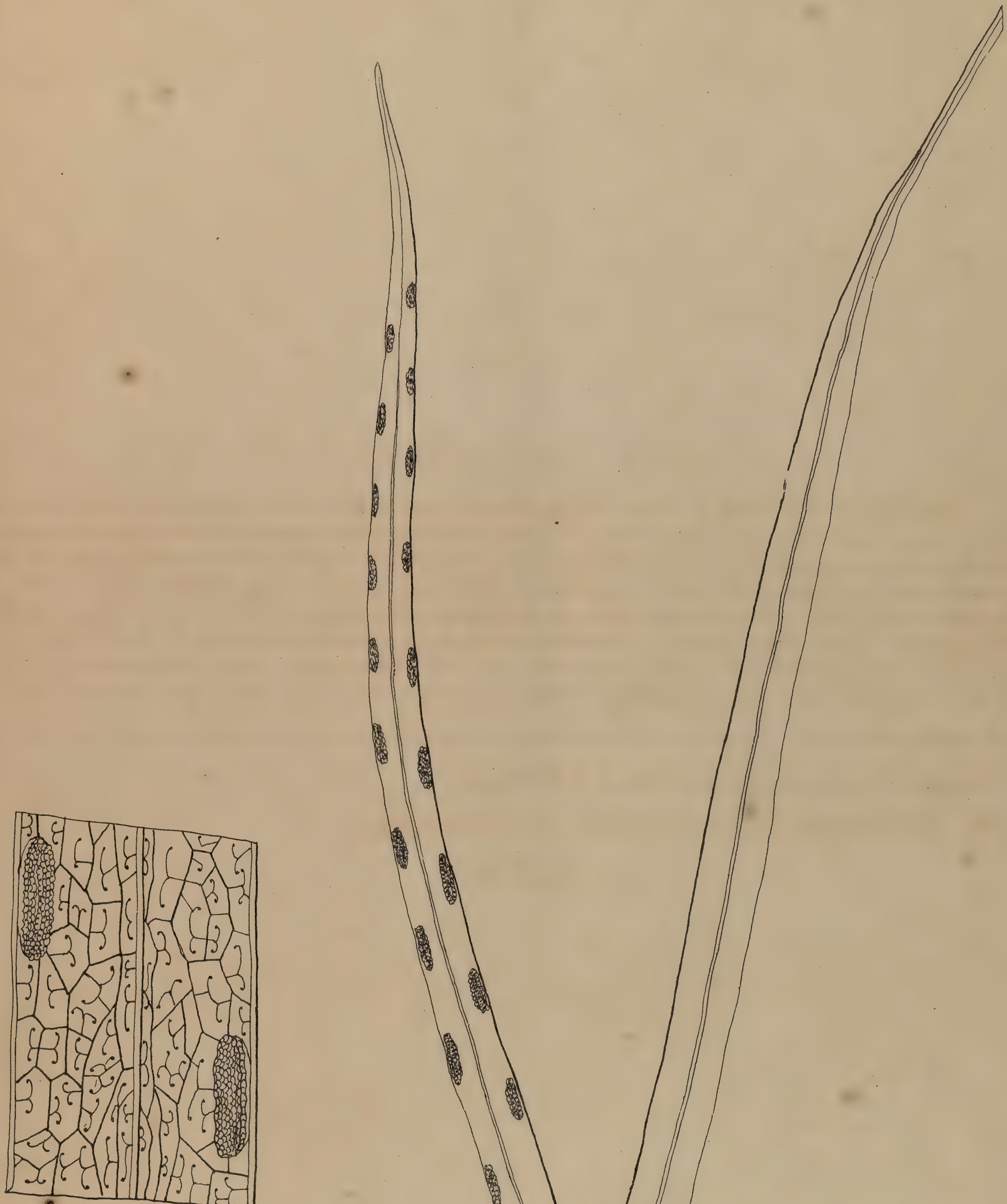
1. PLEOPELTIS LONGIFOLIA (Metten.) Caudex horizontal, creeping, thick squamose, stipites approximate, 2-3 inches long, fronds 1-2-3 feet long, $\frac{3}{4}$-$1\frac{1}{4}$ inch wide, thick, carnoso-coriaceous, glabrous, linear-lanceolate, obtusely acuminate, gradually long-attenuated below on the stipes, entire, the margins sub-revolute, venation internal, very indistinct, costules veniform united by transverse veins into rather large areoles then into irregular lesser ones, which include free veinlets, sori compital oblong, forming a line or series near the margin rather close-placed, sunk into the substance of the frond, and forming a corresponding elevated line on the upper surface, capsules mixed with long-stipitate scales.—*Hook. Sp. Fil.* v. 60—*Metten. Polyp. p.* 87 ;—Grammitis longifolia, *Bl. En. Fil. Jav., p.* 119, *and* Pleopeltis *in Add., and* Gr. decurrens *and* Pleopeltis decurrens, *Bl. ll. cc.* ;—Polyp. contiguum, *Wall. n.* 285 ?—*Hook. Ic. Pl.* x. *t.* 987, (*or Cent. of Ferns t.* 87), *Fil. Exot. t.* 20 ;—Phymatodes *and* Drynaria revoluta, *J. Sm.* ;—Paragramma, *Blume and Moore Ind. Fil.* xxxii.

Mr. Moore adopts Blume's former name and places this fern amongst the Tænitideæ, with which it certainly has some affinity.

The specimen figured is from Moulmein (Rev. C. S. P. Parrish).

Hab. Malay Islands and Peninsula, Java, Birmah, Luzon, Singapore, Mergui.

PLATE No. VII.



Pleopeltis longifolia
(Metten)

Govindoo del.

G. Winchester del & lith. Madras.

2. PLEOPELTIS SINUOSA (Wall.) Caudex much branched, long-creeping or scandent on trees, sparingly radiculose, $\frac{1}{2}$ an inch to 2 inches thick, almost woody when dry, probably carnose when recent studded, as it were, with large conical processes upon which the stipites are or have been articulated, and which appear to increase much in size after the fronds have fallen, the whole densely covered (as it were tessellated) with nearly orbicular appressed whitish peltate scales with a dark spot in the centre, stipites 1-2 inches long, glabrous and scaleless, fronds sub-dimorphous, sub-coriaceo-membranaceous, glabrous ; *sterile* ones 3-6-7 inches long, $\frac{3}{4}$-1 inch broad, sub-elliptical, oblong obtuse entire ; *fertile* ones longer, sometimes a foot-16 inches long, $\frac{1}{2}$-$\frac{3}{4}$ of an inch wide, linear-elongato-oblong obtuse, the margins more or less sinuated, the base in both attenuato-decurrent, venation copious, anastomosing, forming large very irregular areleso filled with lesser ones (formed by more slender veins), and these include branched or simple veinlets which occasionally again anastomose, sori remote, large, oblong, immersed in a cavity which forms pustules on the upper side arranged in a single series nearer the margin than the costa.—*Hook. Sp. Fil.* v. 61 ;—*Wall. Cat. n* 2231.

The figure is taken from Sir W. Hooker's Icones Filicum.

Hab. Straits of Malacca, Amboyna, Isle of Jobi, New Hebrides, Java, Mergui, Birmah.

PLATE No. VIII.

Govindoo del.

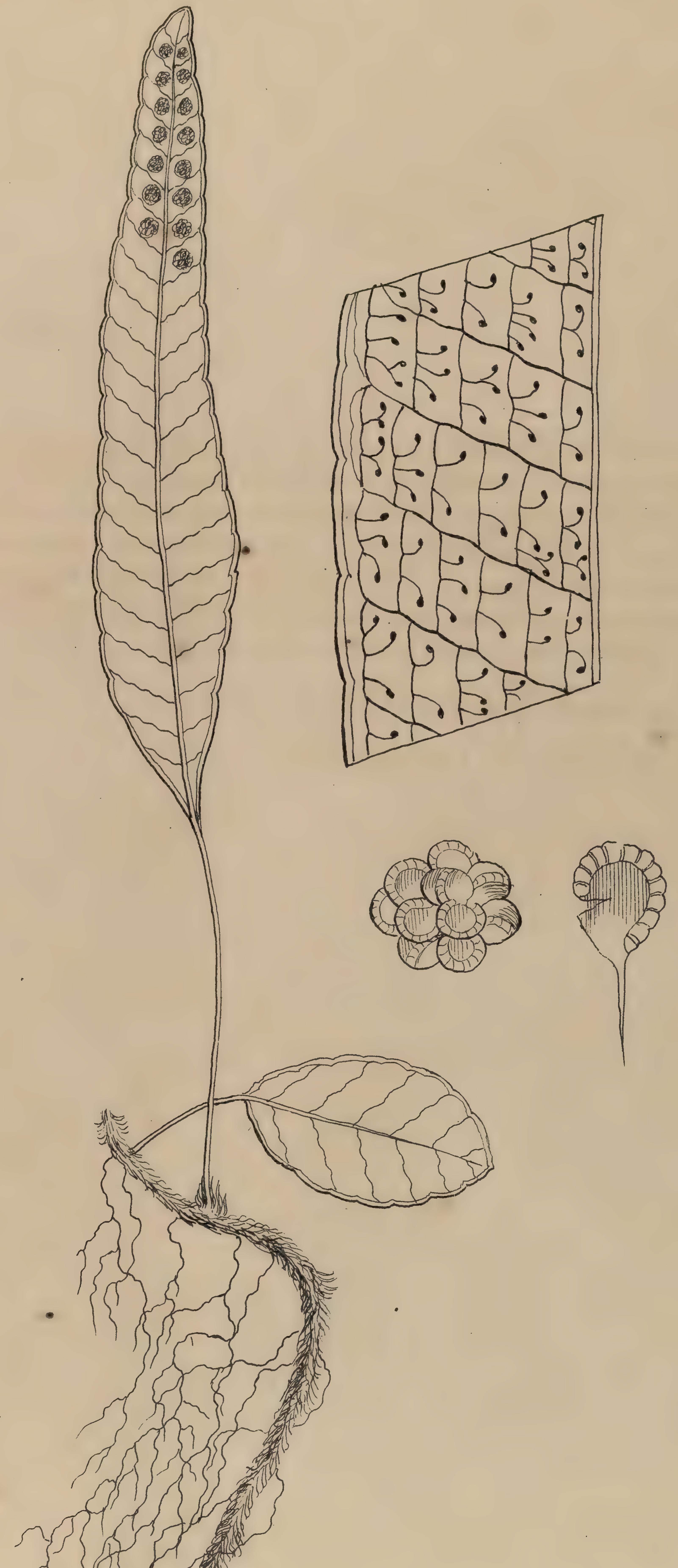
G. Winchester del. & lith. Madras.

3. PLEOPELTIS RHYNCOPHYLLA (Hook.) Caudex creeping, slender, paleaceous, sub-squarrose with subulate ferruginous scales, stipites scattered, slender, 1-2 inches long of the *sterile* frond, 2-4 of the *fertile* one, fronds firm, chartaceo-membranaceous, glossy, slightly thickened, remotely crenate; *sterile* ones 1-2 inches long, elliptical, or sub-ovate, obtuse; *fertile* ones 3-6 inches long, lanceolate from near the base, gradually and long-acuminated, below cuneato-attenuated, venation distinct, slightly prominent, the costules are connected by transverse veins forming areoles which enclose free veinlets which latter sometimes unite with opposite veins, the sori are mostly confined to the narrow acuminated apex and when mature are very large in a single series on each side of the costa.—*Hook. Sp. Fil.* v. 65;—*Hook. Ic. Plant* 955 *(or t.* 55 *of Cent. of Ferns).*

The specimen figured is from Birmah (Rev. C. S. P. Parish).

Hab. Assam, Khasya, (alt. 4,000 feet), Birmah.

PLATE No. IX.



Pleopeltis rhyncophylla
(Hook.)

Govindoo del: G. Winchester del & lith. Madras.

4. PLEOPELTIS NORMALIS (Don.) Caudex very long, creeping or scandent, often as thick as a writing-pen, the young portions clothed with black subulato-setaceous squarrose scales, in age perfectly smooth, stipites very numerous on the caudex, more or less approximate, 1-2 inches long, and as well as the costa reddish stramineous, fronds firm-membranaceous, glabrous, varying extremely in sizes 1-2 feet or more long, $\frac{3}{4}$ of an inch to 2 inches wide, lanceolate or elongato-lanceolate or loriform, generally long and finely acuminate, gradually attenuated and decurrent at the base, entire sub-falcate or flexuose; venation slightly prominent especially beneath, costules none, veins forming rather large but very irregular areoles with free included veinlets, sori mostly compital, rather large, arranged in a single regular series nearer the costa than to the margin or in a waved line partially scattered or very copious, and irregularly dispersed over the whole under-surface of the frond.—*Hook. Sp. Fil.* v. 69;—*Metten. Polyp. p.* 86, *t.* 1, *f.* 41-43.—Var. *a*, *normalis;* frond 1-1½ foot long, ½ an inch to 1 inch wide;—Polypod. normale, *Don. Prodr. Nep. p.* 1;—Phymatodes, *Pr.*;—Drynaria, *J. Sm.*;—Var. *β*, *latifrons;* fronds 1·1½ foot long, 1-2 inches wide, sori regularly uniserial;—Var. *γ*, *sparsisora;* fronds 2-3 feet long, ½-1 inch wide, sori irregularly scattered and copious.—P. longifrons, *Wall. Cat. n.* 274;—*Hook. and Grev. Ic. Fil. t.* 65;—Drynaria, *Fée.*

The specimen figured is from Moulmein (Rev. C. S. P. Parish).

Hab. Var. *α* and *γ*, Nepaul, Khasya, Assam (alt. 4-6,000 feet). Var. *β* Malacca, Moulmein, (alt. 4,000 feet), China, Formosa.

PLATE No. X.

Pleopeltis normalis.
(Don)

Govindoo del.

G. Winchester del & lith. Madras.

5. **PLEOPELTIS TRIDACTYLA** (Wall.) [Vide Ferns of S. India, p. 60].

The plant here figured is from Birmah (Captain the Honorable J. Dormer), and seems distinct from the small S. Indian species figured in "*The Ferns of S. India.*" It is undoubtedly Wallich's species, so that the S. Indian and Ceylon fern if distinct will have to receive another name.

PLATE No. XI.

Polypodium pteropus. Bl:
abortive form only. [illegible]

Synopsis p. 362.

[illegible]

Pleopeltis tridactyla
(Wall)

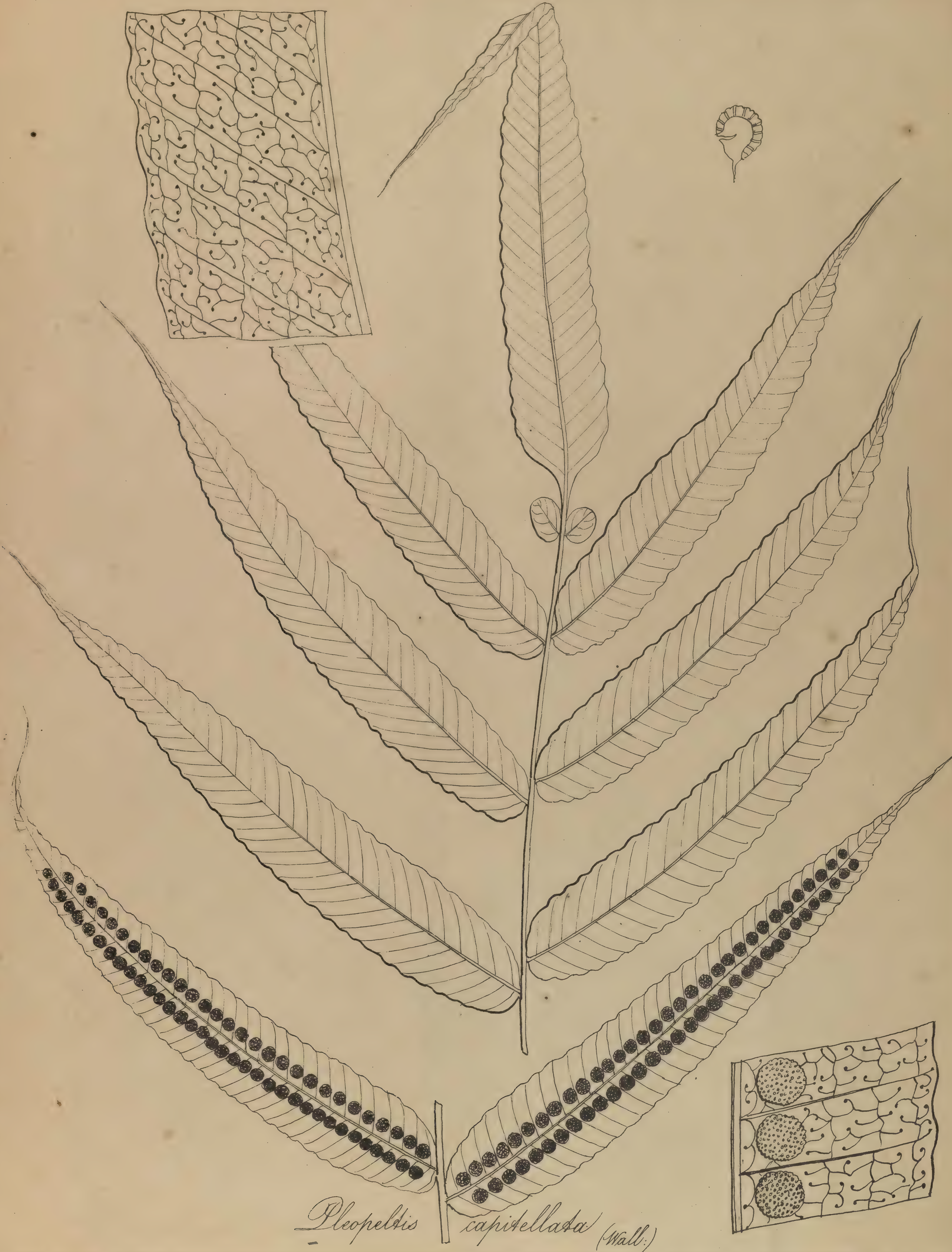
Govindoo del: G. Winchester del & lith. Madras.

6. PLEOPELTIS CAPITELLATA (Wall.) Caudex creeping, furnished with hair-like ovate or lanceolate scales, stipites 1 foot and more long, fronds 1-2 feet long, membranaceous or coriaceo-membranaceous, glabrous, ovato-oblong, pinnated, (young fronds often simple,) pinnæ 1 to 21 pairs opposite or alternate articulated on the rachis, sessile or more or less petiolate, 5-9 inches long, ½ to 2 inches broad, obtuse at the base, finely acuminated at the apex, (often with a distinct membranaceous margin,) entire or slightly sinuato-lobate-costules, straight extending to the margin, these are connected by transverse veins with 3-4 series of areoles again divided into lesser areoles including free divaricating veinlets, sori large, superficial in a single series near the costa or 1-2 in the primary areoles.—*Wall. Cat.* 306, Phymatodes capillata ;—*Hook. Sp. Fil.* v. 90 ;—Phymatodes tennicauda, *Hook. l. c.* ;—Phy. Himalayensis, *Hook. l. c.* 91 ;—Polyp. juglandifolium, *Don.* ;—Polyp. venustum, *Wall. c.* 305 (not Desv.)

The specimen figured is from Nynee Tal (Mr. Oldham.)

Hab. Nepaul, Bhotan, Sikkim, Khasya, Assam, Kumaon (7,000 ft.), Srinuggur, Simla, Nynee Tal.

PLATE No. XII.



Pleopeltis capitellata (Wall:)

Govindoo del.

G. Winchester del & lith Madras.

DRYNARIA. (See Ferns of S. India, p. 63.)

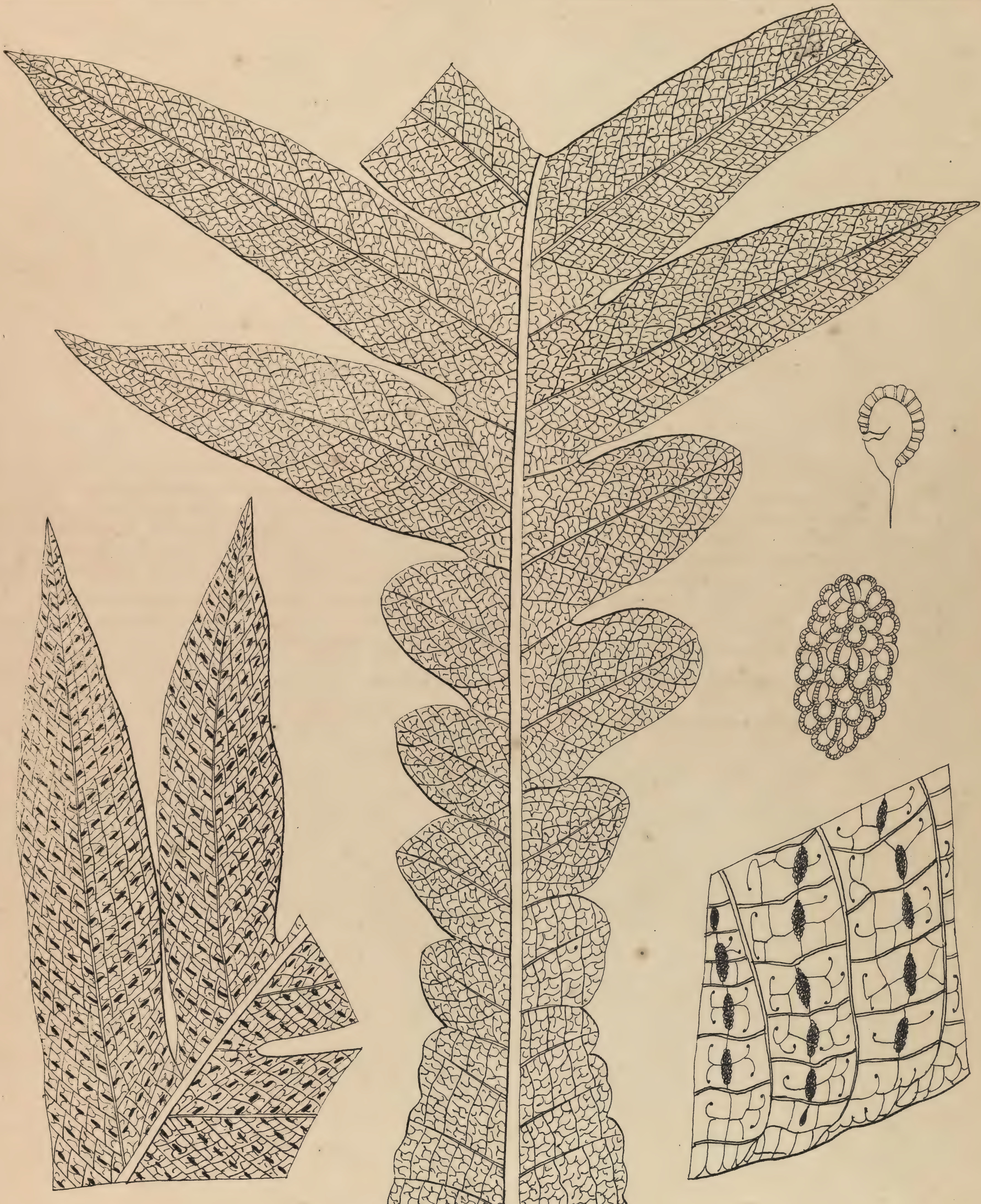
1. DRYNARIA CORONANS (Wall.) Caudex thick, creeping, branched and interwoven, villoso-paleaceous with aureo-nitent scales, fronds large, uniform when growing arranged in a circle, firm, coriaceo-membranaceous, but rather thin and translucent, 2 and more feet long, from a broad sessile cordate, lobato-pinnatifid base, (then suddenly contracted), lanceolate deeply almost to the rachis pinnatifid, segments 8-12 inches long, $\frac{3}{4}$ to 1 inch and more wide, oblongo-lanceolate, acuminate, lower ones gradually shorter, entire incrassated at the margin, venation very manifest, costules parallel extending to the margin, these are connected by transverse veins forming 5-6 soriferous areoles and then again generally two or three others which include free veinlets, sori oval, often confluent, longitudinally, solitary in the primary areoles, forming an excentric series always nearer one costule than the opposite one.—*Hook. Sp. Fil.* v. 94 ;—*Wall. Cat. n.* 288 ;—*Metten. Polyp. p.* 121 *t.* 40, 41, *(venation)* ;—*Hook. Fil. Exot. t.* 91 ;—Phymatodes, *Pr.* ;—Drynaria, *J Sm.* ;—Var. β sori of the series confluent ;—Polyp. contiguum, *Wall. in Herb. Hook. (not Cat. n.* 285.)

The specimen figured is from Moulmein (Capt. the Honorable J. Dormer.) – given to him by me, C Parish.

Hab. Nepaul, Kumaon, Assam, Sikkim, Khasya, Mishmee, Moulmein, Hongkong.

PLATE No. XIII.

PLATE XIII.



Drynaria coronans. Wall.

Govindoo del.

G. Winchester del. & lith. Madras.

PERANEMEÆ.

WOODSIA. *R. Brown, Trans. Lin. Soc.* xi. 173 *t.* ii.

(Physematium, *Kaulfuss* ;—Hymenocystis, *C. A. Meyer* ;—Hymenolæna, *C. A. Meyer* ;—Pe rrinia, *Hooker* ;—Polypodii sp., *Auct.* ;—Aspidii sp., *Auct.* ;—Alsophilæ sp., *Auct.* ;—Dicksoniæ sp., *Auct.* ;—Cystopteridæ sp., *Auct.* ;—Lastreæ sp., *Presl.* ;—Acrostichi sp., *Auct.* ;—Ceterachis sp., *Auct.* ;—Nothochlænæ sp., *Desvaux.*)

Gen. Char. *Sori* involucrate, *i. e.*, with inferior indusia, globose ; the *receptacles* medial or terminal. *Involucre* soft, membranaceous, pateriform and fimbriately crinite, or calyciform with the margin lobed, or sub-globose with a contracted mouth. *Veins* simple, forked or pinnate, from a central costa ; *venules* free.

Fronds membranaceo-herbaceous, small, pinnate, pinnato-pinnatifid or bi-pinnate. Rhizome-tufted, erect or decumbent. A very well-marked group, distinguished by the involucriform nature of the indusium, the sessile sori, and free veins. (Moore.)

1. WOODSIA ELONGATA (Hook.) Glanduloso-pilose especially above, fronds oblong, elongate, pinnated, pinnæ rather distant, alternate sessile from a broadish base, oblong-obtuse, pinnatifid about ½ way down, segments short rounded inciso-dentate, each bearing a sorus (rarely more) near the sinus, involucres small, soon bursting with an irregular opening at the top, glanduloso-pilose, stipes and rachis slightly chaffy.

The specimen figured is from the Himalayas (Dr. Thomson.)

Hab. Himalayas, Krande.

PLATE No. XIV.

Woodsia elongata
(Hooker.)

Govindoo del.

G. Winchester del & lith. Madras.

DIDYMOCHLÆNEÆ.

DIDYMOCHLÆNA. *Desvaux Berl. Mag.* v. 303 *t.* 7 *fig.* 6.

(Monochlæna, *Gaudichaud* ;—Hippodium, *Gaudichaud ms.* ;—Ceramium, *Reinwardt* ;—Tegularia, *Reinwardt* ;—Hysterocarpus, *Langsdorff M.S.* ;—Diplazii sp., *Raddi.* ;—Aspidii sp., *Auct.* ;—Asplenii sp., *Auct.* ;—Adianti sp., *Auct.*)

Gen. char. *Sori* indusiate, elliptic-oblong ; the *receptacles* oblong, dorsal at the apex of the venules. *Indusium* of the same form, obtuse at both ends, attached longitudinally along its centre to a crest formed elevation of the receptacle, free at the margins. *Veins* flabellately-forked ; *venules* direct, free ; the anterior one in each fascicle soriferous, the sterile ones clavate at the apex.

Fronds bi-pinnate, coriaceous ; pinnules dimidiate or sub-dimidiate, obtuse, articulated, sub-ecostate. Rhizome arborescent. Handsome tree ferns, with peculiar fructifications. (Moore.)

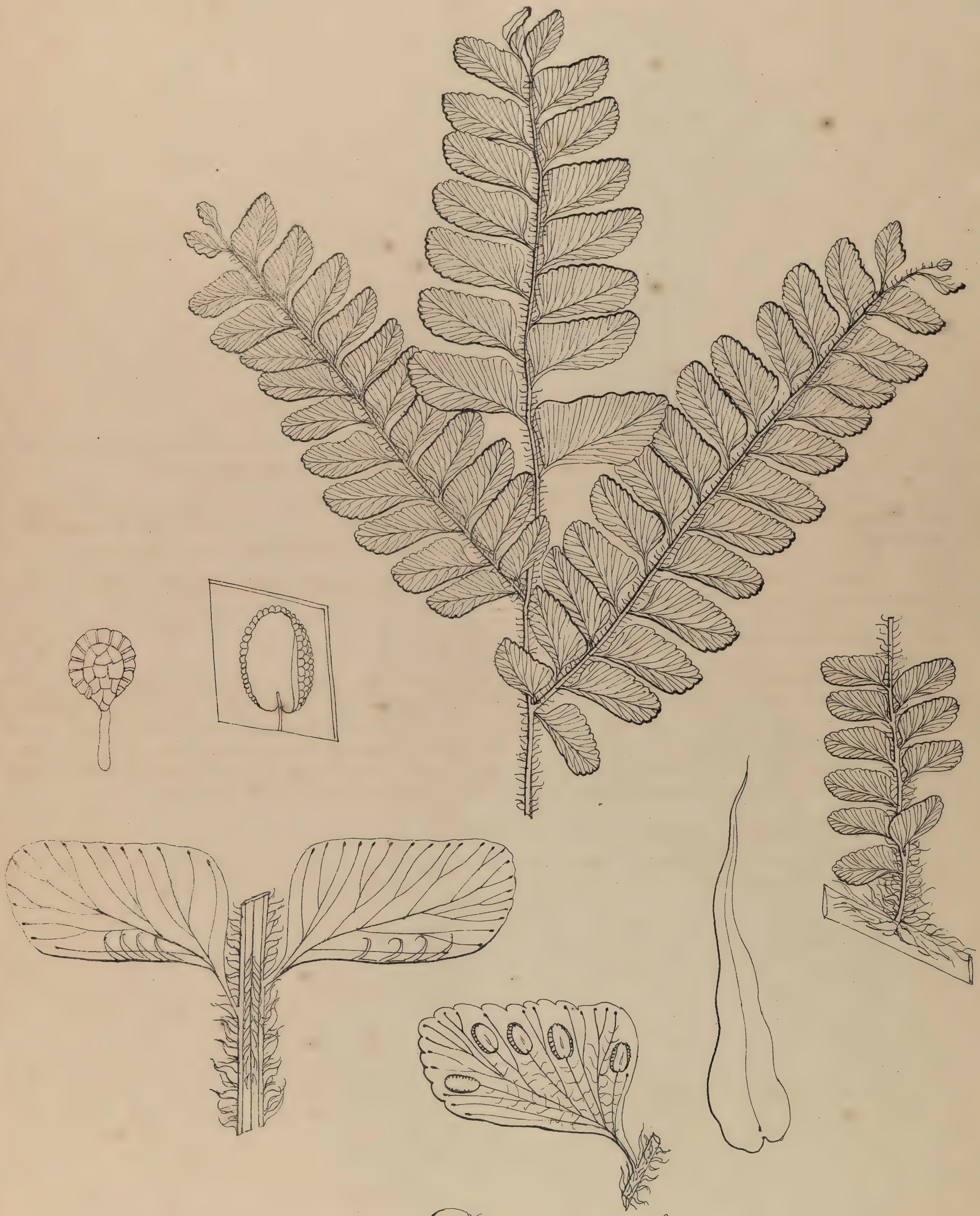
Agenus consisting of a single species.

DIDYMOCHLÆNA LUNULATA (Desv.) *Hook. Sp. Fil.* iv. 5 ;—*Desv. in Mein. Soc. Linn.* vi. *p.* 282 ;—*Hook. Gard. Ferns. pl.* 17 ;—D. sinuosa, *Desv. l. c. p.* 28;—*Mart. Ic. Pl. Crypt. Bras. p.* 95 *t.* 28 *and* 29 *f.* 1 ;—*Hook. Gen. Fil. t.* 8 ;—D. squamata, *Desv. Journ. Bot. Appl.* 1 *p.* 5 *t.* 2 *f.* 4 ;—D. truncatula, *J. Sm. Gen. of Ferns p.* 84 ;—D. dimidiata, *Kunze. in Linnœa,* xviii. *p.* 122 ;—*Schk. Fil. Suppl. p.* 200 *t.* 84 ;—*Pappe. and Raws. Syn. Fil. Afr. p.* 15 ;—Aspidium truncatulum, *Sw. Syn. Fil. pp.* 52 *and* 252. *Willd. Sp. Pl.* v. *p.* 256 ;—Aspid. squamatum, *Willd. Sp. Pl.* v. 250 ;—Monochlæna sinuosa, *Gaudich. in Freyc. Voy. Bot. p.* 340 *t.* 12 *f.* 3 ;—Diplazium pulcherrimum, *Raddi Fil. Bras. p.* 42 *t.* 59 ;—Lonchitis ramosa, &c., *Plum. Fil. p.* 43 *t.* 56.

The specimen figured is from Birmah (Rev. C. S. P. Parish.)

Hab. Tropical America, Brazil, N. Granada, Andes of Ecuador and Peru, W. Indian Islands, Java, Luzon, Birmah, S. Africa, Natal, Madagascar, Part of Fernando-Po-Fiji Islands.

PLATE No. XV.



Didymochlæna lunulata
(Desv)

Govindoo del.

G. Winchester del. & lith. Madras.

ADIANTEÆ.

ADIANTUM. (See Ferns of Southern India, p. 1.)

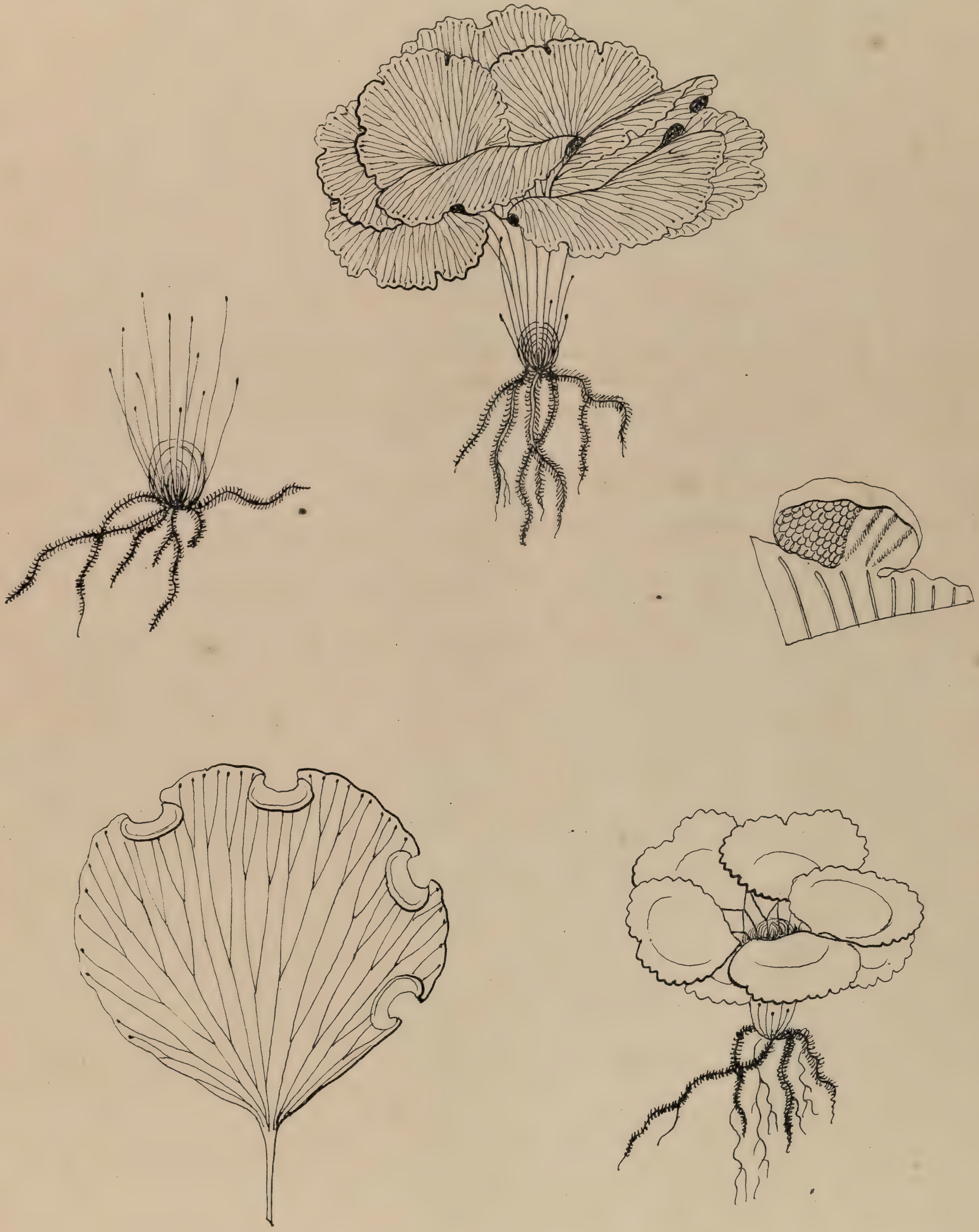
ADIANTUM PARISHII (Hook.) Small cæspitose no distinct caudex, roots few fibrous tomentose, fronds orbicular flabellate membraneous pellucid, sterile ones crenato-dentate, fertile ones pauci (3-5) lobate, sinuses deep soriferous, veins originating from the base flabellato-divergent repeatedly dichotómous, stipes slender filiform ebeneous-black shining articulated at the summit.—*Hook. Sp. Fil.* ii. 237, *and Fil. Exot.* i. *pl.* 51.

The specimens figured are from Moulmein (The Rev. C. S. P. Parish).

Hab. Moulmein on a limestone rock (called Twa-Kabin,) 2,000 feet elevation.

PLATE No. XVI.

PLATE XVI.



Adiantum Parishii

(Hook)

Govindoo del

G. Winchester del & lith Madras.

ADIANTEÆ.

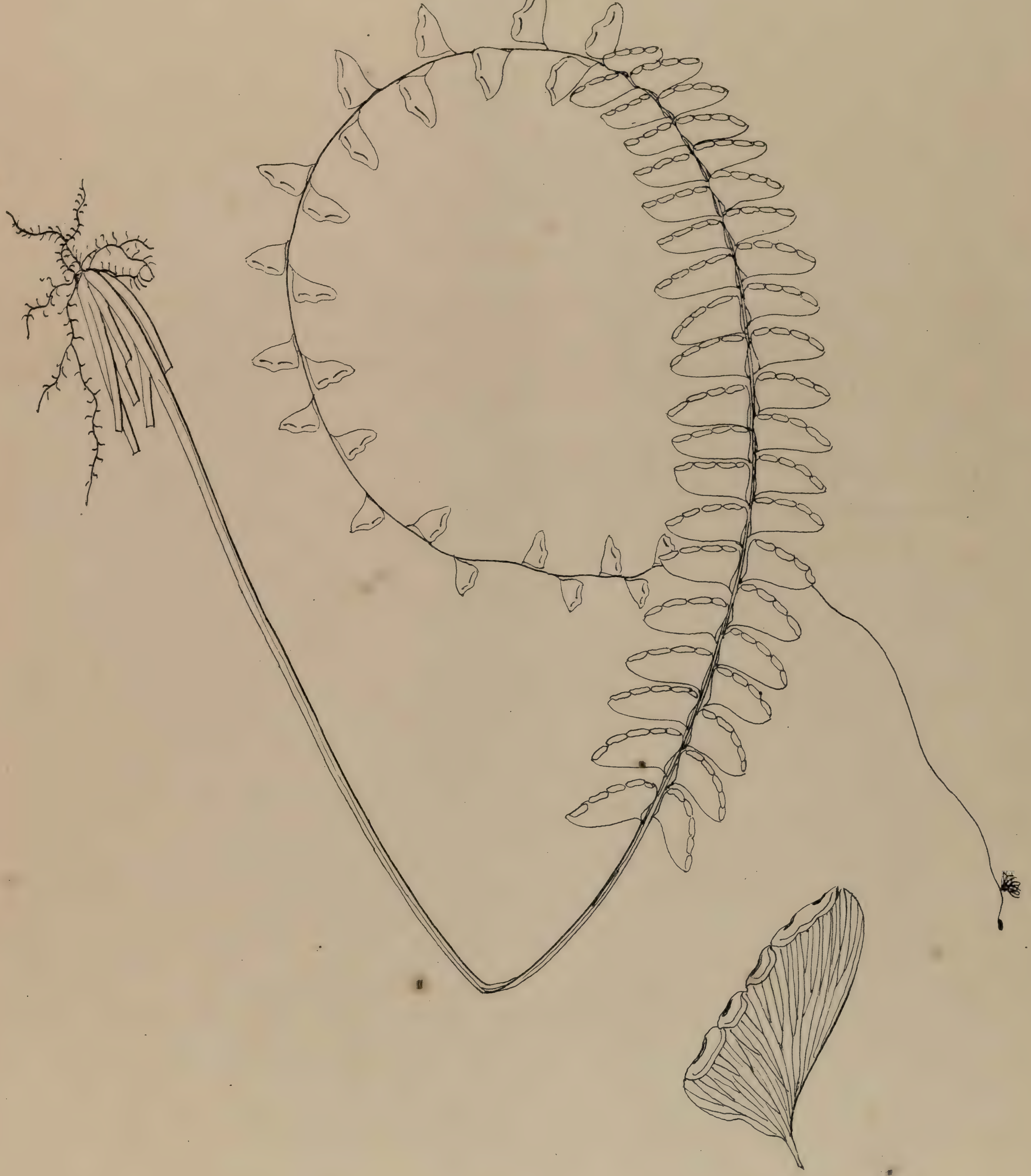
ADIANTUM EDGEWORTHII. (Hook.) Everywhere glabrous, fronds linear-oblong elongated attenuated and often rooting at the apex and there bare of pinnæ, pinnæ nearly sessile alternate dimidiato-oblong rather acute, the upper base truncated and parallel with the rachis, superior margin obscurely lobed rather more so in the sterile pinnæ, indistinct lobes truncated and bearing the sori one on each lobe, sori oblong elongated approximate, stipes elongated slender and as well as the rachis ebeneous glabrous.—*Hook. Sp. Fil.* ii. 14.

Nearly allied to A. caudatum but pinnæ nearly entire.

The figure is taken from Sir W. Hooker's "Species Filicum."

Hab. Mooltan, (Punjab.)

PLATE No. XVII.



Adiantum Edgeworthii
(Hook)

Govindoo del. G. Winchester del & lith Madras

ADIANTEÆ.

ADIANTUM EMARGINATUM (Bory.) Fronds bi-tri-pinnate, pinnules obcordato-cuneate, sterile ones serrulated at the apex, sori oblong.—*Willd.*—*Bory. in Willd. Sp. Pl.* v. 449 ;—*Hook. Sp. Fil.* ii. 39.

The figure is taken from Sir W. Hooker's plate of Dr. Wight's specimen from the Madras Peninsula. I have not been fortunate enough to find it unless I have confounded it with "*A. Æthiopicum,*" Sir W. Hooker says it has quite the habit of *Æthiopicum* but with sori resembling both as to position and form those of *A. Capillus-Veneris.*

Hab. Isle of Bourbon, Madras Peninsula, Malacca.

PLATE No. XVIII.

Adiantum emarginatum.
(Will)

Govindoo del.   G. Winchester del & lith Madras.

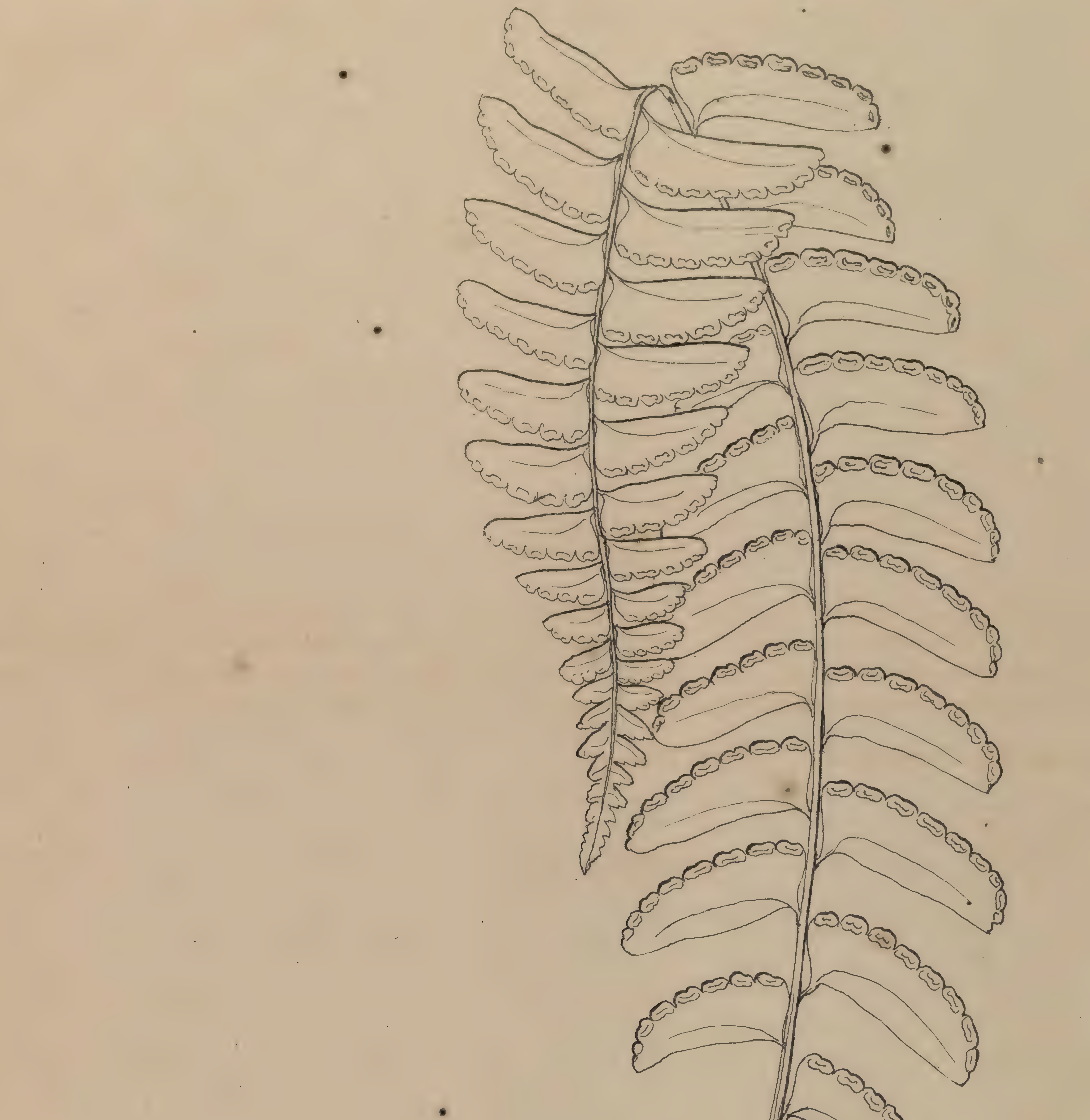
ADIANTEÆ.

ADIANTUM SOBOLIFERUM. (Wall.) Everywhere glabrous, fronds, (a foot high often soboliferous, *Wall.*) broadly lanceolate pinnated, pinnæ sub-membranaceous sessile, or lower ones only on very short petioles semi-elliptical slightly falcate, obtuse the upper base truncated and parallel with the rachis, upper margin rather equally lobed, sterile ones denticulate, lobes soriferous, sori sub-reniform, stipes ebeneous, rachis and stipes with a membranous margin on each side !—*Hook. Sp. Fil.* ii. 13.

The figure is taken from Sir W. Hooker's "Species Filicum.".

Hab. Burmah.

PLATE No. XIX.



Adiantum soboliferum
(Wall)

Govindoo del. G. Winchester del & lith. Madras.

ADIANTEÆ.

ADIANTUM VENUSTUM. (Don.) Rather small ovate tri-pinnate, pinnules firm membranaceo-chartaceous glabrous and slightly glaucous beneath shortly petiolulate obovato-cuneate rarely sub-rhombeo-acuminate striated, the superior margin rounded scarcely ever or but slightly 2 or 3 lobed finely dentato-serrate, fertile lobes with 2 rarely 3 notches, each notch bearing a rather large sorus at the bottom, involucres reniform-cordate sub-membranaceous, stipes and slender rachis everywhere ebeneous glossy glabrous.—*Hook. Sp. Fil.* ii. 40.—A. venustum, *Don. Prodr. Fil. Nep.* 16.—*Wall. Cat.* 81.

The specimen figured is from Dalhousie, (Captain Dyas.)

Hab. Nepaul, Simla, Mussoorie, Sreenuggur, Kamroop, Meerut, Khasya, (6,500 elevation,) Affghanistan.

PLATE No. XX.

Adiantum venustum
(Don)

Govindoo del.

G. Winchester del & lith. Madras.

PTERIDEÆ.

ONYCHIUM. (See Ferns of Southern India, p. 10.)

ONYCHIUM LUCIDUM (Sp.) Caudex creeping? stipites six inches to a foot and more long, and as well as the rachises pale brown or stramineous, frond a foot and more long, ovato-acuminate membranaceo-coriaceous, glossy 3-4 times pinnatisected (primary and secondary divisions pinnated,) segments uniform or nearly so in the sterile and fertile ones, all narrow linear a little tapering below ultimate ones moderately long, all gradually acuminated (not mucronate even in the fertile ones), sori oblong short occupying nearly the whole of the back of the segments, involucres white or cream-colour membranaceous meeting at the back.—*Hook. Sp. Fil.* ii. 121.—*Spreng. Syst. Veget.* iv. *p.* 66.—*Hook. Gen. Fil. t.* xi.—Cheilanthes lucida, *Wall. Cat. n.* 69;—Cheilanthes contigua, *Wall. Cat. n.* 69;—Leptostegia lucida, *Don. Prodr. Fl. Nep. p.* 14;—Scolopendrium lucidum, *Hamilton's* MS. *(fide Don.)*

The specimen figured is from Nynee Tal, (Mr. Oldham.)

Hab. Kumaon, Nepaul, (700 to 7,500 feet elevation,) Mussoorie, Gurwal, Simla, Khasya, Mishmee, Nynee Tal.

PLATE No. XXI.

Onychium lucidum (Spr)

Govindoo del.

G. Winchester ad & lith. Madras.

PTERIDEÆ.

PTERIS. (See Ferns of Southern India, p. 11.)

PTERIS CALOMELANOS (Link.) Glabrous, caudex short thick very scaly, fronds subspithameous cæspitose sub-coriaceous oblong-triangular bipinnate, pinnules all petiolulate cordato—(rarely subhastato)—triangular very obtuse entire sometimes sub-trilobate or sinuate at the margin, the sinus deep and narrow, veins dichotomously radiated, sori continuous, involucres membranaceous, stipites short scaly at the base and as well as the slender rachises and petioles black-ebeneous very glossy. *Hook. Sp. Fil.* ii. 140.—*Link. Fil. Hort. Berol. p.* 61.—*Fée. Gen. Fil. p.* 129;—Allosorus calomelanos, *Presl. Tent. Pterid. p.* 153.—*Hook. Bot. Mag* Pteris calomelanos, *Sw. Syn. Fil. p.* 106.—*Willd. Sp. Plant.* v. *p.* 393.—*Kze. in Linn. p.* 525.—*Schlecht. Adumbr. F.* 24;—Platyloma, *J. Sm.* Pteris hastata, *Thunb. (not of others.)*

The specimen figured is from Simla.

Hab. S. Africa, elevation 400 to 4,000 feet.—

Pteris calomelanos
(Link)

Govindoo del

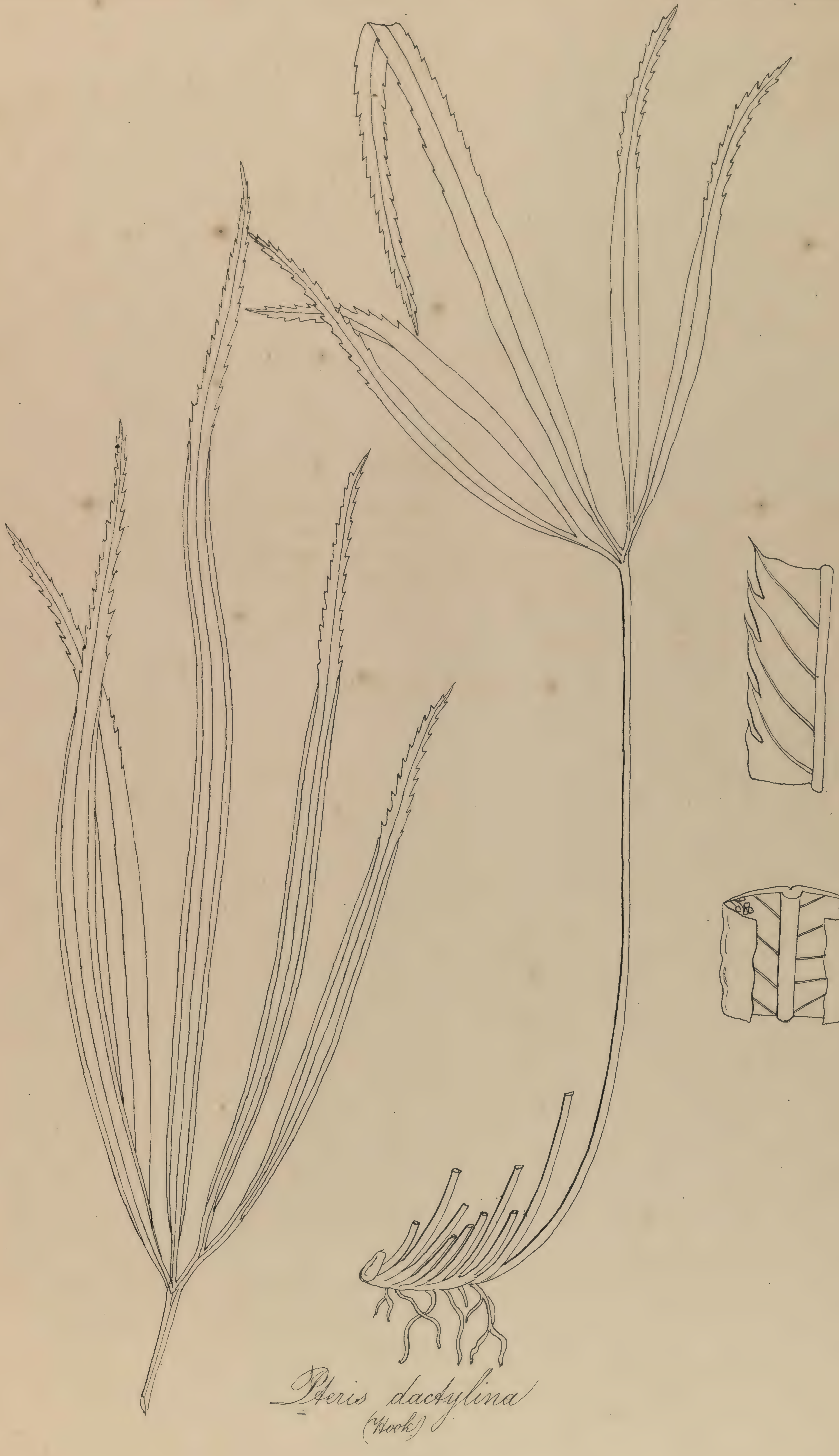
G. Winchester del & lith Madras.

PTERIDEÆ.

PTERIS DACTYLINA (Hook.) 4 inches to a foot high, caudex creeping sending out wiry fibres, fronds sub-coriaceo-membranaceous rather rigid 2-6 inches long digitate, pinnæ 3-5 subradiate linear sessile slightly tapering below much and narrowly acuminated the sterile portions coarsely and deeply spinuloso-serrate especially towards the apex, involucres rather broad subintramarginal membranaceous close-pressed, veins simple, stipites numerous tufted very slender and as well as the midribs of the pinnæ (very prominent beneath) stamineous. *Hook. Sp. Fil.* ii. 160.

Hab. Sikkim—Himalaya, (Dr. Thomson.)

PLATE No. XXIII.



Pteris dactylina
(Hook)

Govindoo del.

G. Winchester del & lith Madras.

PTERIDEÆ.

PTERIS GRIFFITHII (Hook.) A foot and more high and slender graceful, caudex none, roots of tufted fibres, frond ovato-lanceolate sub-menbranaceous pinnate, upper pinnæ simple 2 or 3 of the lower pairs again pinnated simple, pinnæ and pinnules exactly linear ½ an inch to an inch and a half long obtuse, mostly opposite, every where entire sessile with the base adnate and decurrent so as to form a narrow wing to the rachis, lowest pinnules of the inferior pinnæ sometimes again divided, terminal pinnule always elongated, veins distant once forked, veinlets divaricating, sori continuous, involucres sub-intramarginal membranaceous not reaching to the apex, stipites slender longer than the fronds stramineous-brown and a little scaly at the base.—*Hook. Sp. Fil.* ii. 170.

The figure is taken from Sir W. Hooker's "Species Filicum."

Hab. Mishmee, Assam.

PLATE No. XXIV.

Pteris Griffithii
(Hook)

Govindoo del

G. Winchester del & lith. Madras.

PTERIDEÆ.

CAMPTERIA. (See Ferns of Southern India, p. 14.)

CAMPTERIA WALLICHIANA (Ag.) Frond ample glabrous sub-membranaceous 3-partite, lateral branches compoundly divided terminal one elongated pinnated, pinnæ numerous sessile 4-6 inches long, linear-lanceolate acuminate deeply pinnatifid, segments linear-lanceolate obtuse, sterile ones serrulate all approximate about ½ an inch long, basal veins monarcuate, the rest free and forked rarely a solitary areole at the base of the costule, stipes very long, 5-6 feet stout rich castaneous and as well as the paler-coloured rachises very smooth and glossy.—*Hook. Sp. Fil.* ii. 206.—Pteris Wallichiana, *Ag. Sp. Gen. Pterid. p.* 69.—Pt. umbrosa, *Wall. Cat. n.* 109 *(not of Br.)*—Pt. pellucens, *Ag. Sp. Gen. Pterid. p.* 43 ?—Pt. connexa, *J. Sm. Fil. Philip. in Hook. Bot. Journ.* iii. *p.* 405 *(name only)*—Pt. pectinata, *Don. Prodr. Fl. Nepaul, p.* 15.—(Agardh refers to this *Pt. aspericaulis,* Wall., which is however a slight var. of *Pt. quadriaurita.*)

The specimen figured is from Sikkim (Dr. Thomson.)

Hab. Kumaon, Gurhwal, Sikkim, Khasya, Luzon.

PLATE No. XXV.

Campteria Wallichiana
(Ag)

Govindoo del.

G. Winchester del & lith. Madras.

PTERIDEÆ.

LITOBROCHIA. (See Ferns of Southern India, p. 73.)

LITOBROCHIA PEDATA (L.) Caudex short thick erect or declined copiously rooting, fronds fasciculate, when mature coriaceous opaque cordate tripartito-pedate, lateral primary divisions bi-partite on the inferior side or on both sides pinnatifid, terminal one pinnatifid generally cuneate and narrowed at the base, the segments with entire lobes or again pinnatifid, ultimate ones oblong with more or less acute sinuses, the margin of the sterile plant crenulated, sori continuous, involucres narrow entire, veins everywhere anastomosing so as to form a network of oblong hexagonal areoles, stipes terete ebony-black hispid at the base.—*Hook. Sp. Fil.* ii. 208.—Pteris pedata, *Linn. Sp. Pl. p.* 1532.—*Sw. Syn. Fil. p.* 105.—*Langsd. et. Fisch. Ic. Fil. p.* 12. *et* 20.—*Willd. Sp. Pl. p.* 358.—*Schkh. Fil. p.* 91 *t.* 100.—*Raddi. Fil. t.* 65. *f.* 3. *t.* 66 *and* 66 *b.*—*Br. Prodr. Nov. Holl. p.* 155.—*Hook. Bot. Mag. t.* 3,247, *and Fil. Exot. t.* 34.—Pt. palmata, *Willd. Sp. Pl.* v. *p.* 357.—Pt. collina, *Raddi. Fil. Bras. p.* 44. *t.* 65. *f.* 1, 2.—Pt. varians, *Raddi. l. c. t.* 64.—Pt. Mysurensis, *Wall. Cat. n.* 87/4.—Pt. polytoma, *Kze. in Linnæa,* xxiii. *p. p.* 289 *and* 322.—Litobrochia pedata, *Pr. Tent. Pterid. p.* 149.—*Moore Ind. Fil.* i. *p.* xliv.—Cassebeera pedata, *J. Sm. Gen. of Ferns p.* 47, *and En Ferns in Hort. Kew. p.* 14.—Doryopteris pedata, *J. Sm. Cat. Kew. Ferns, p.* 4 *and Cat. of Cult. Ferns, p.* 35.—*Fée. Gen. Fil. p.* 133.—Hemionitis, profunde laciniata, &c., *Plum. Am. p.* 24. *t.* 34. *Fil. p.* 130. *t.* 152.

The specimen figured is from Moulmein (Rev. Parish.)

Hab. West Indies, Jamaica, St. Domingo, Cuba, Martinique, Brazil, Island of Trinidad, Peru, Chacapoyas, Columbia, New Granada, Venezuela, Galapagos, Tropical New Holland—Pulney Hills (Dr. Wight), Nilgiris (Rev. E. Johnson,) *in Herb. Hook.*—Burmah.

PLATE No. XXVI.

Litobrochia pedata (L)

Govindoo del: G. Winchester del & lith Madras.

PTERIDEÆ.

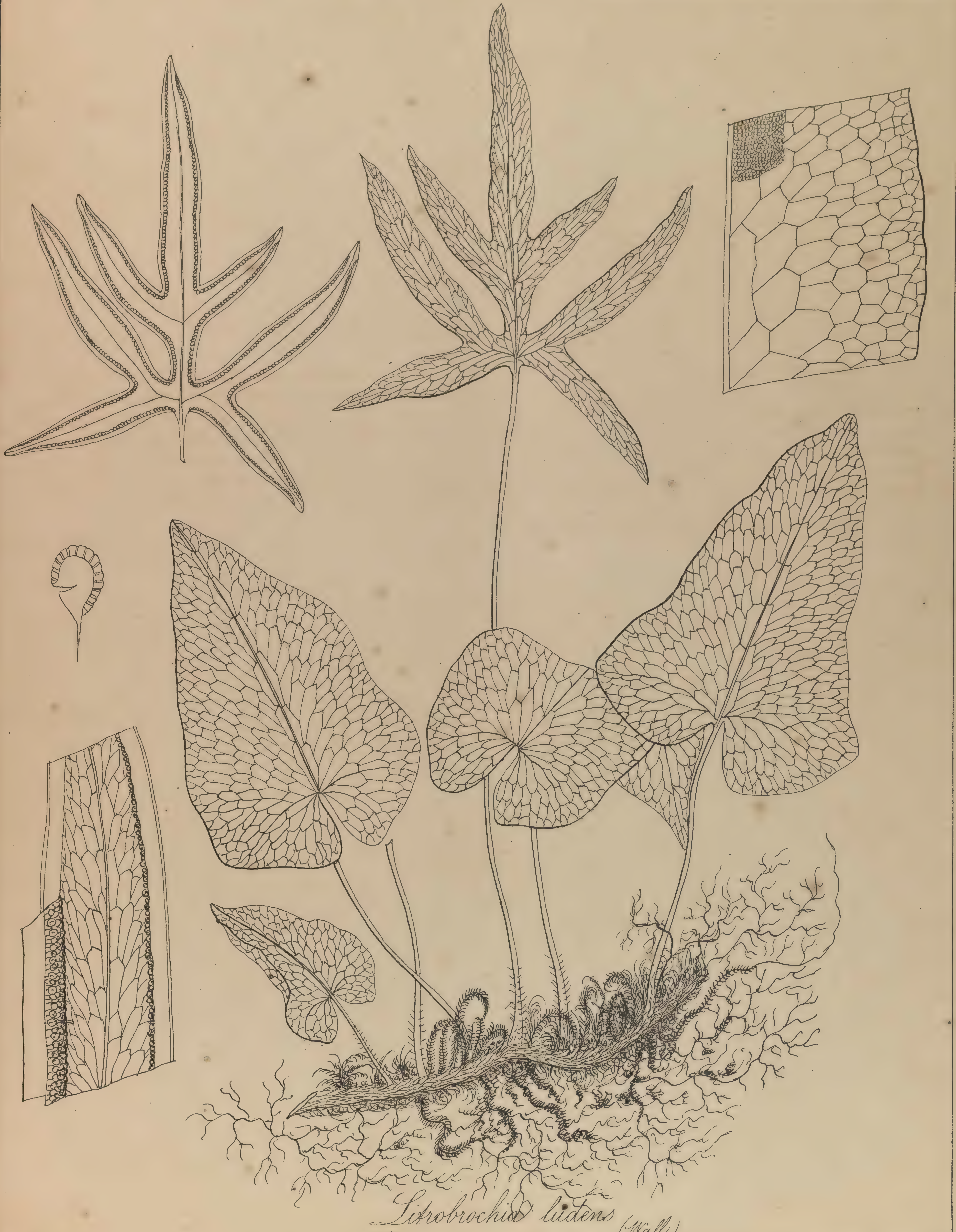
LITOBROCHIA LUDENS (Wall.) Caudex long creeping branched, thicker than a crow's quill, scaly, throwing out copious woolly fibrous roots, fronds remote on the caudex long-stipitate coriaceous opaque pale beneath triangulari-subhastate and undivided, or hastately 5 lobed or deeply 3 lobed or 3 partite and pedate, the terminal lobe again 3 or pinnatifidly 5 lobed, the lateral lobes pinnatifid more or less deeply on the inferior side *(deorsum pinnatifidis,)* segments acuminate broad-lanceolate or long-linear, veins everywhere laxly reticulated, the areoles oblong and mostly parallel or nearly so with the costa and margin, sori on the most deeply divided and narrowest fronds continuous, stipes very long and as well as the main rachises beneath black-ebeneous.—*Hook. Sp. Fil.* ii. 210.—Pteris ludens, *Wall. Cat. n.* 88.—Doryopteris Wallichii, *J. Sm. En. Phil. Philipp. in Hook. Bot. Journ.* iii. *p.* 404.

The specimen figured is from Moulmein (Rev. Parish.)

Hab. Burmah, Luzon.

PLATE No. XXVII.

PLATE XXVII.



Litrobrochia ludens (Wall:)

Gorinaoo del:

G. Winchester del & lith. Madras.

LINDSÆEÆ.

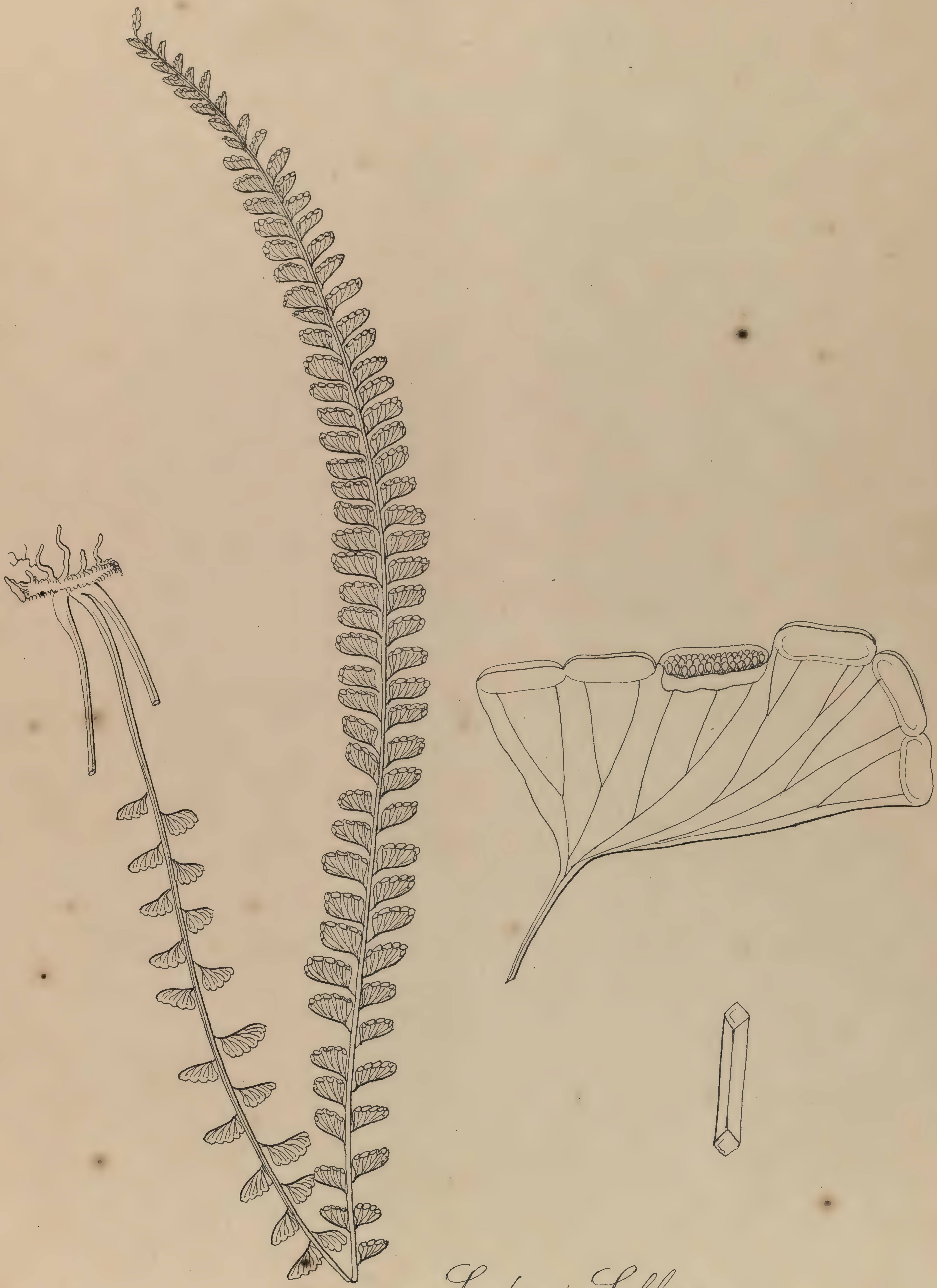
LINDSÆA. (See Ferns of Southern India, p. 7.)

Lindsæa Lobbiana (Hook.) Caudex somewhat creeping, fronds tufted pinnate linear-lanceolate much acuminate, lower pinnæ remote, the rest approximate, all of them slightly petiolate patent sub-membranaceous subnitent obliquely flabellate or half ovate the superior base truncate, upper margin curved (convex) lobate soriferous, sori interrupted linear, stipes rather short and rachis brown.—*Hook. Sp. Fil.* i. 205.

The specimen figured is from Moulmein (Rev. Parish.)

Hab. Burmah, Java.

PLATE No. XXVIII.



Lindsæa Lobbiana
(Hook)

Govindoo del.

G. Winchester delg lith Madras.

LINDSÆEÆ.

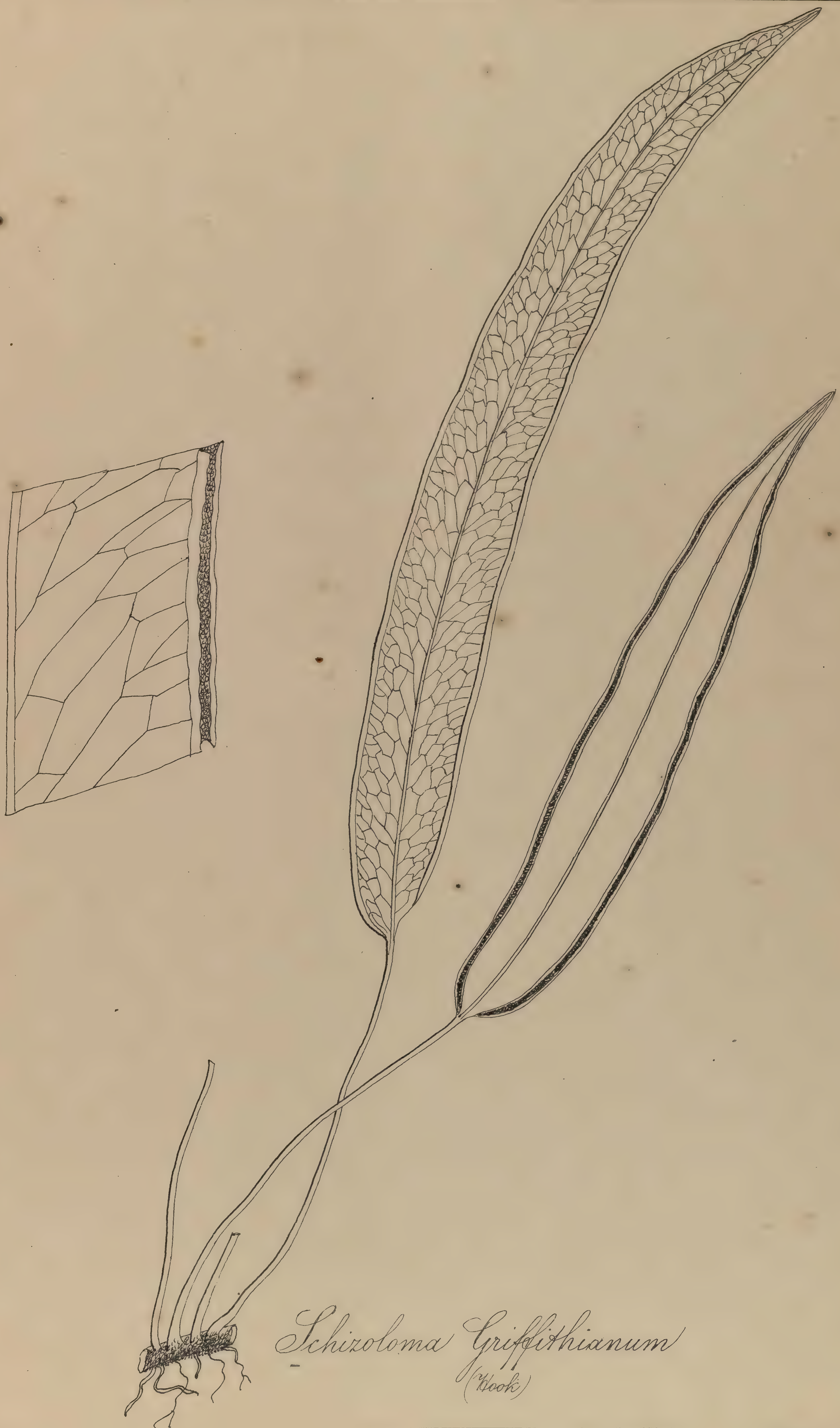
SCHIZOLOMA. (See Ferns of Southern India, p. 9.)

SCHIZOLOMA GRIFFITHIANUM (Hook.) Lax and flaccid, caudex creeping short, stipites shorter than the elongato-anceolate simple membranaceous costate frond, veins reticulated, sorus continuous round the entire margin.—*Hook. Sp. Fil.* i. 219.

Hab. Mergui, Burmah. C. Parish.

PLATE No. XXIX.

only a young state of L. ensifolia
See my specimens C. Parish.



Schizoloma Griffithianum (Hook)

Govindoo del.

G. Winchester del & lith. Madras.

TRIBE. GLEICHENINEÆ.

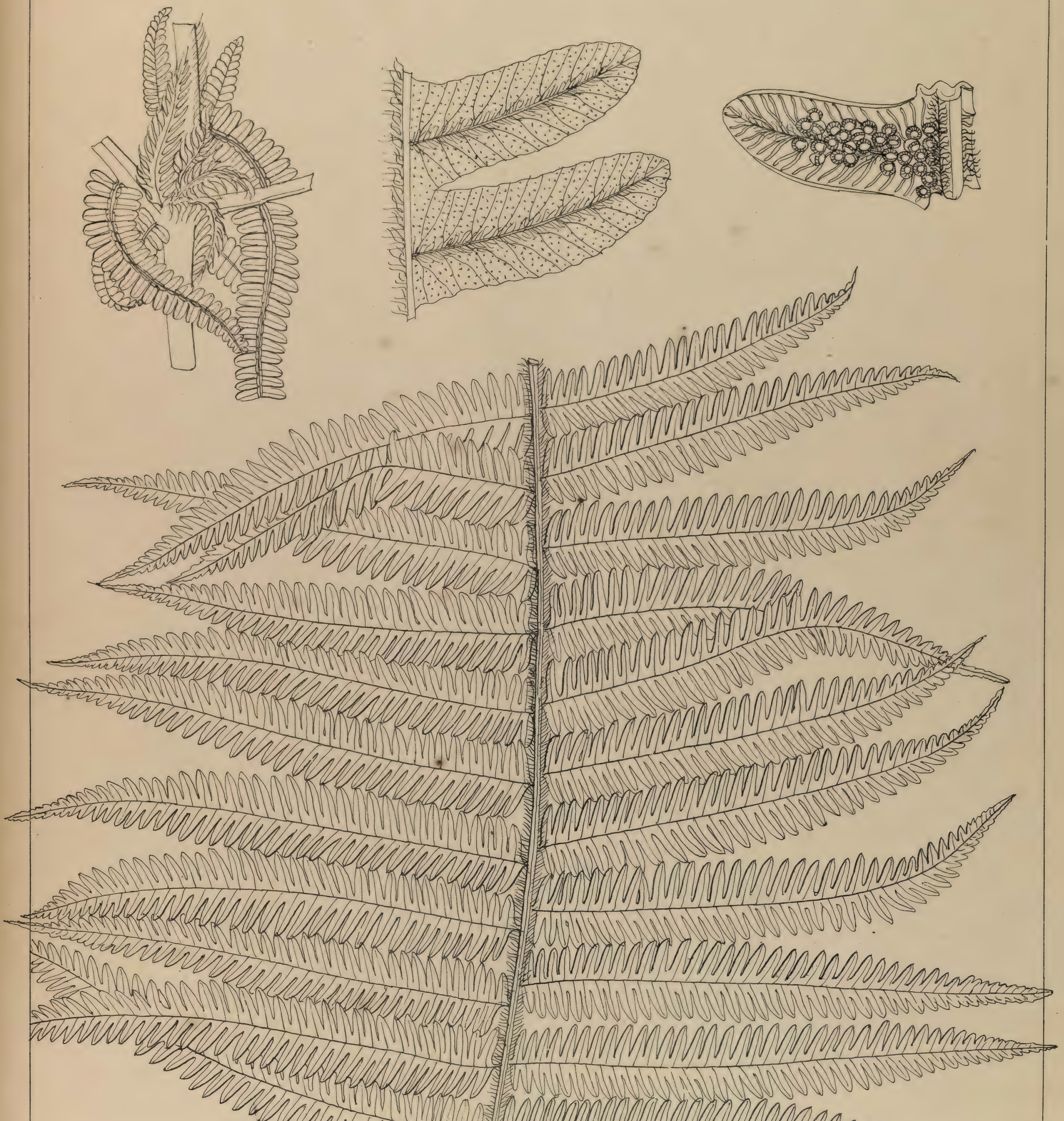
GLEICHENIA. (See Ferns of Southern India, p. 25.)

GLEICHENIA GIGANTEA (Wall.) primary pinnæ opposite oblong acuminate, its rachis above with a slightly elevated very obtuse margin, secondary lanceolate acuminate alternate deeply pinnatifid, segments oval, oblong, very obtuse entire with an elevated crest at the base above forming an interrupted marginal line to the rachis which beneath as well as the costa is woolly, scarcely glaucous, capsules 3-5.—*Hook. Sp. Fil.* 1-5 *Wall. Cat. n.* 157.—Hicriopteris speciosa, *Presl.;* Mesosorus giganteus, *Hasskl.;* Mertensai gigantea, *Wall. Hb.*

The specimen figured is from Sikkim (Thomson.)

Hab. Assam, Nepaul Bhotan, Sikkim, Khasya, China, Fokien, Java.

PLATE No. XXX.



Gleichenia gigantea (Wall.)

Corundoo del, G. Winchester del & lith. Madras.

ASPIDIEÆ.

POLYSTICHUM. (See "Ferns of Southern India," p. 41.)

POLYSTICHUM STIMULANS (Kunze.) Caudex short stout oblique very scaly, stipites densely tufted 2-4 inches long often chaffy flexuose slender and tawny as is the rachis, fronds sub-coriaceous 4-6-8 inches long, linear or oblong-lanceolate acute pinnate, pinnæ lax distant distinctly petiolate from an oblique truncate cuneate base rhomboideo-triangular with generally a spinose auricle at each base and with two or three large sharp serratures which as well as the apex are terminated with a spine, rarely one of the auricles becomes a free pinnule, sori few in two rows one on each side of the costules.—*Hook. Sp. Fil.* iv. 12.—*Kze. Herb. fide. Metten. Aspid p.* 43.—Polystichum, *Pr. Tent. Pterid. p.* 83.—Aspid pungens, *Wall. Cat. n.* 368, *(not Klfs.)*—Aspid ilicifolium, *Don. Prodr. Nep. p.* 3 *(not Fée.)*—Aspid sagittatum, *Jacquem. Mss. in Herb. Mus. Paris and Herb. Hook.*

The specimen figured is from Sikkim, (Dr. Thomson) and partly from Sir Will. Hooker's plate in "*Species Filicum.*"

Hab. Nepaul, Kumaon (elevation 9,000 feet), Simla, Valley of the Jumna, Sikkim, Changtam, Tambur river.

PLATE No. XXXI.

Polystichum stimulans
(Kze)

Govindoo del:

G. Winchester del & lith: Madras.

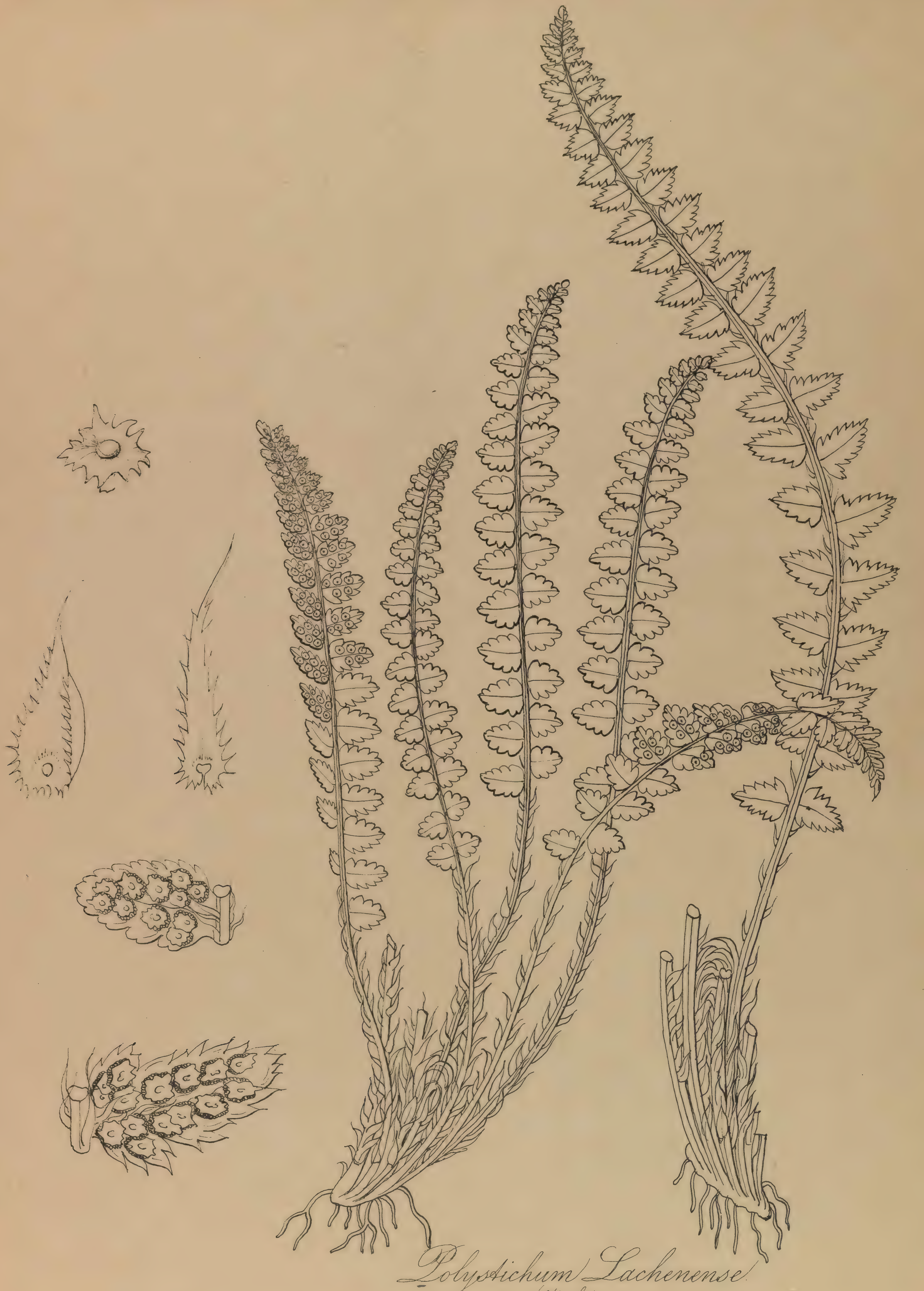
ASPIDIEÆ.

POLYSTICHUM LACHENENSE (Hook.) Caudex short oblique stout scaly above, stipites very densely tufted numerous and compact stout marcescent 2-4 inches long, sub-flexuose glossy black or dark brown scaly, fronds 4-8 inches long, linear-lanceolate coriaceous pinnate; pinnæ, the largest less than ½ an inch long, patent rather distant sessile deltoideo-ovate sub-pinnatifido-crenate rather obtuse sub-pinnuloso-serrate or unarmed, sori in two rows on each pinnule, rachis stramineous setaceo-paleaceous with whitish appressed scales.—*Hook. Sp. Fil.* iv. 8.

The figure is taken from Sir W. Hooker's "Species Filicum."

Hab. Sikkim, Himalaya, Lachen.

PLATE No. XXXII.



Polystichum Lachenense
(Hook.)

Govindoo del.

G. Winchester del. & lith. Madras.

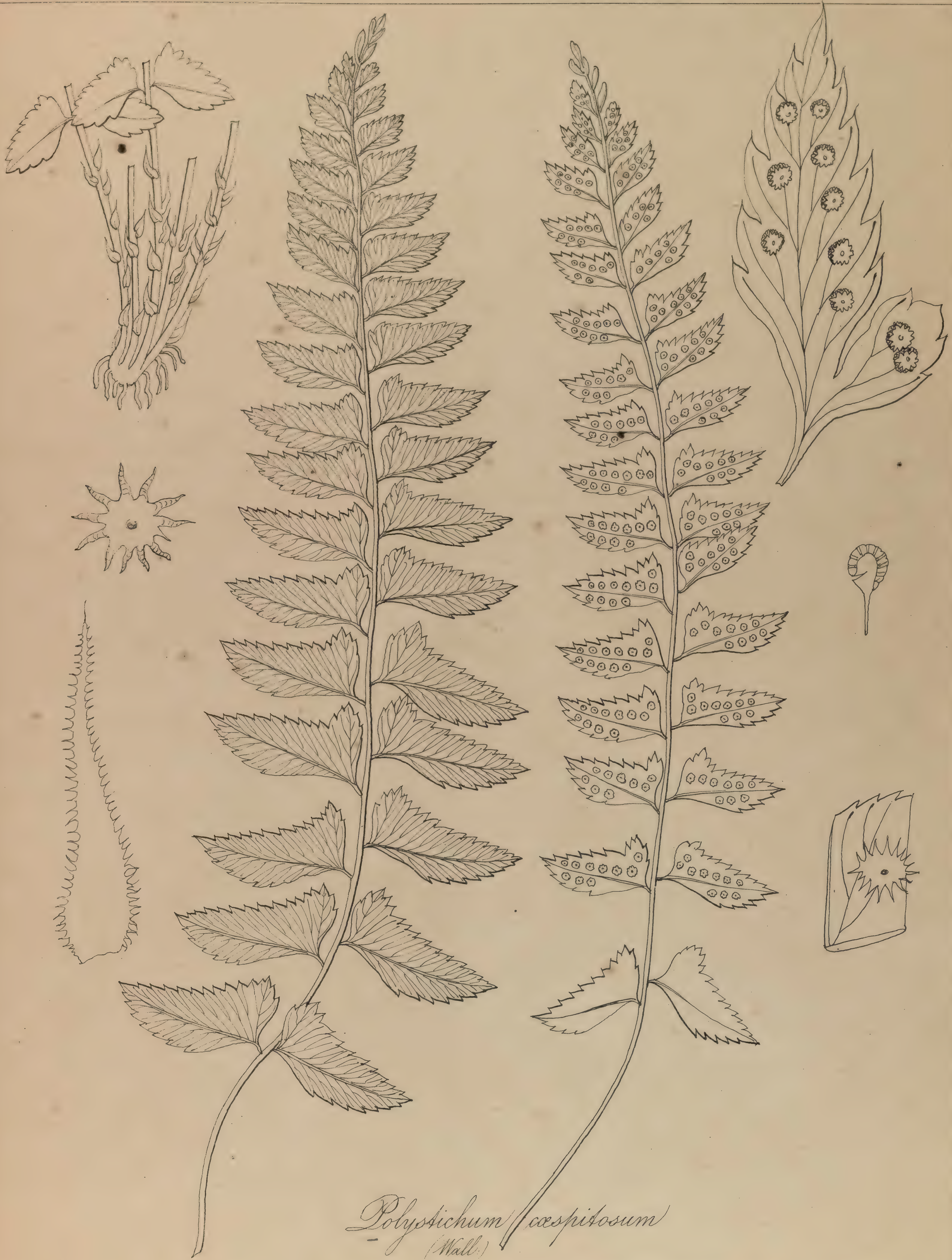
ASPIDIEÆ.

POLYSTICHUM CÆPITOSUM (Wall.) Caudex a short thick scaly rhizome, scales often ciliated, stipites tufted slender 2-6 inches long, stramineous as well as the rachis, fronds 4 inches to a span and more long oblong—or linear-lanceolate acute rather than acuminate chartaceo-membranaceous often glossy pinnated, pinnæ rather distant horizontal $\frac{1}{2}$-$1\frac{1}{4}$ inch long petiolate from an entire obliquely cuneate truncate and obtusely auricled superior base, trapezoideo-ovate obtuse or acute sharply but scarcely mucronato-serrate, inferior base incised, sori uniseriate on the pinnæ and the auricles between the costa and the margin, involucres peltate ciliate at length deciduous.—*Hook. Sp. Fil.* iv. 13.—*Wall. Cat. n.* 367.—*Metten. Asspid. p.* 367.—Polystichum, *Schott. Pr.*—Aspidium obliquum, *Don, Nepaul p.* 43 *(fide Moore.)*

The specimen figured is from Nynee Tal, (Oldham.)

Hab. Northern India especially in the Himalayas (elevation 4—10,000 feet,) Nepaul, Simla, Kumaon, Nynee Tal, Lachen, Sikkim, Bhotan.

PLATE No. XXXIII.



Polystichum cæspitosum
(Wall.)

Govindoo del:

G. Winchester del & lith. Madras.

ASPIDIEÆ.

POLYSTICHUM PRESCOTTIANUM (Hook.) Caudex short thick erect or declined paleaceous with very large brown scales, stipites densely tufted stout 1-4 inches long, and as well as the stramineous glossy rachis and costæ and veins especially beneath villous with soft lax hair-like pale-coloured scales, on the stipes mixed with large ovate membranaceous ones, fronds 1-2 feet long, rarely in the broadest part 2 inches wide, elongato-lanceolate acuminate soft and membranaceous gradually narrowing at the base pinnate or sub-bi-pinnate, pinnæ ovato-oblong sessile tapering to an obtuse apex deeply pinnatifid (except at the very apex,) almost to the costa (some of the inferior ones pinnate), lobes or pinnules ovate or oblong without auricle strongly and uniformly serrated the serratures with long soft hair-like points, sori chiefly on the superior half of the frond in two rows near the costule, involucres peltate entire membranaceous.—*Hook. Sp. Fil.* iv. 22.—Aspid. Prescottianum, *Wall. Cat. n.* 363.—*Metten. Aspid. p.* 48.—Polypodium Pseudo-Lonchitis, *Jacquemont, Mss. in Herb. Hook.* β; frond bi-pinnate.

The specimen figured is from the Himalayas, (Dr. Thomson) and from Sir W. Hooker's plate in "Species Filicum."

Hab. Kumaon, Himalayas from extreme west to Bhotan in the east (elevation 10—12,000 feet.)

PLATE No. XXXIV.

Polystichum Prescottianum
(Hook.)

...eeo del: G. Winchester del & lith: Madras.

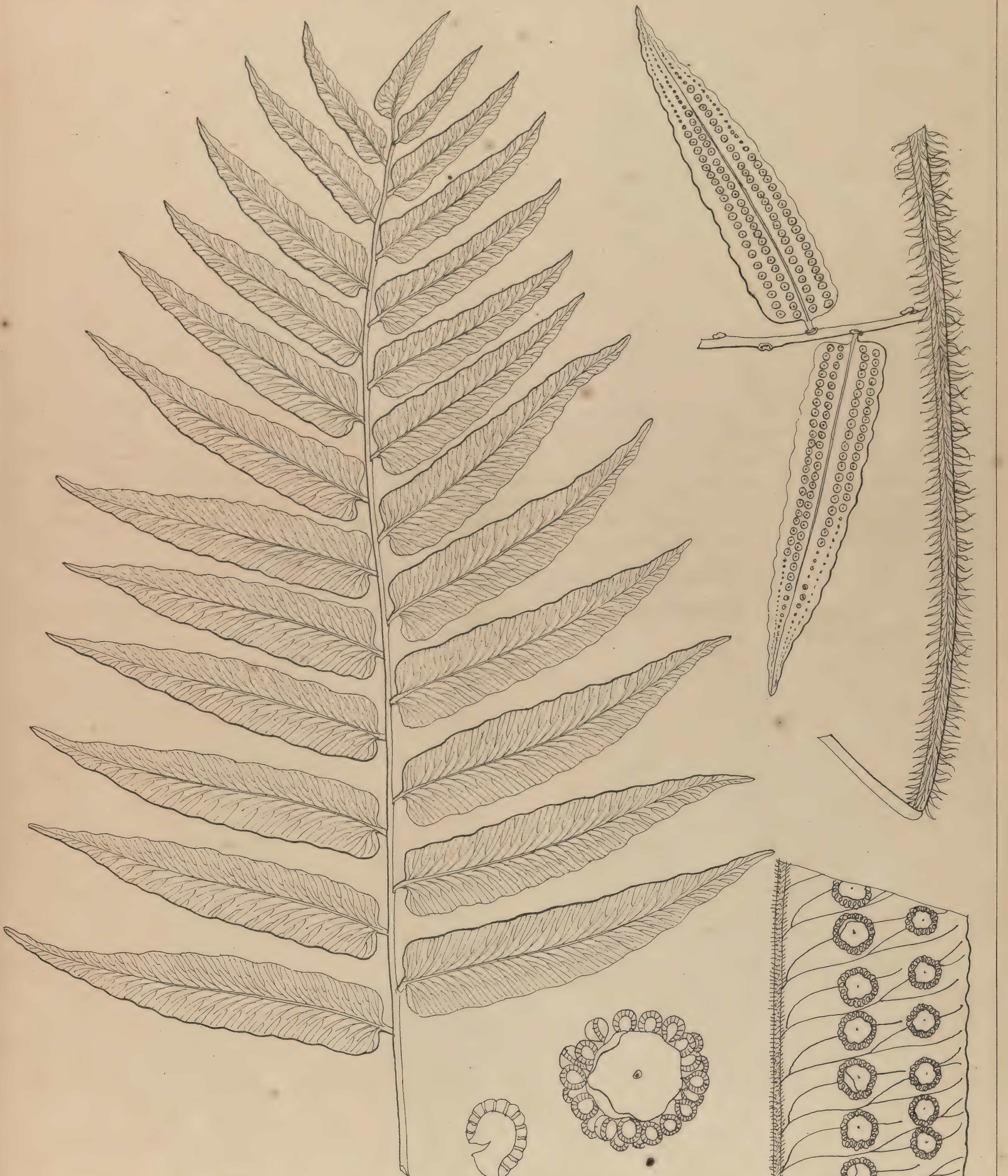
ASPIDIEÆ.

Polystichum semicordatum (Sw.) Caudex thick horizontal creeping? very densely clothed with long ($\frac{3}{4}$ of an inch) subulate scales, stipites solitary (not tufted) stout a span and more long, shaggy with long slender paleaceous scales at length deciduous, fronds 2-3 feet long, broad or ovato-lanceolate (8-10 inches wide), coriaceo-membranaceous blackish-green (when dry) pinnated, pinnæ articulated upon the rachis numerous approximate horizontal, from a broad sessile shortly petiolated semi-cordate base oblong acuminate straight or falcate entire or obtusely crenate (near spinuulose,) sori mostly on the back of the veinlets in four series two on each side, the inner one close by the costa the other between it and the margin, veins fascicled, involucres slightly convex depressed in the middle suberose—var. δ. truncatum; pinnæ at the base on each side transversely truncated.

The specimen figured is from Moulmein, (Rev. C. S. P. Parish.)

Hab. Zwa Kabin, Moulmein—This species occurs in slightly altered varieties in America, the W. Indian islands, Luzon, Cochin, China, and Borneo.

PLATE No. XXXV.



Polystichum semicordatum
(Sw.)

Govindoo del. G. Winchester del & lith. Madras.

ASPIDIEÆ.

LASTREA. (See "Ferns of Southern India," p. 33.)

LASTREA FŒNICULACEA (Hook.) Caudex stout creeping densely clothed with twany satiny ovate-acuminate paleaceous scales, stipites a span to a foot long, stout below and there paleaceous like the caudex, fronds pergamentaceous glossy translucent when fresh, 1-2 feet and more long, oblong-ovate acuminate supradecompoundly pinnate, primary pinnæ (inferior ones) from 4 inches to almost a foot long, long-petioled ovate finely acuminate, secondary ones 1-3 inches long also petioled, these are broken up into a succession of smaller and lesser pinnæ or pinnules and all finely cut into linear acute obscurely costate segments simple or once or twice forked or having a lateral, short tooth which generally bears the solitary rather small sorus, sori sub-globose as broad as the segment or tooth, involucres small dark-brown convex reniform of sub-coriaceous texture, rachises with a few scattered flexuose setæ.—*Hook. Sp. Fil.* iv, 36.—Z. aristata γ. dissecta *Moore.*

The specimen figured is from Sikkim, (Dr. Thomson.)

Hab. Chola, Sikkim, (elevation 8—10,000 feet.)

PLATE No. XXXVI.

Lastrea fœniculacea
(Hook)

Govindoo del.

G. Winchester del & lith. Madras.

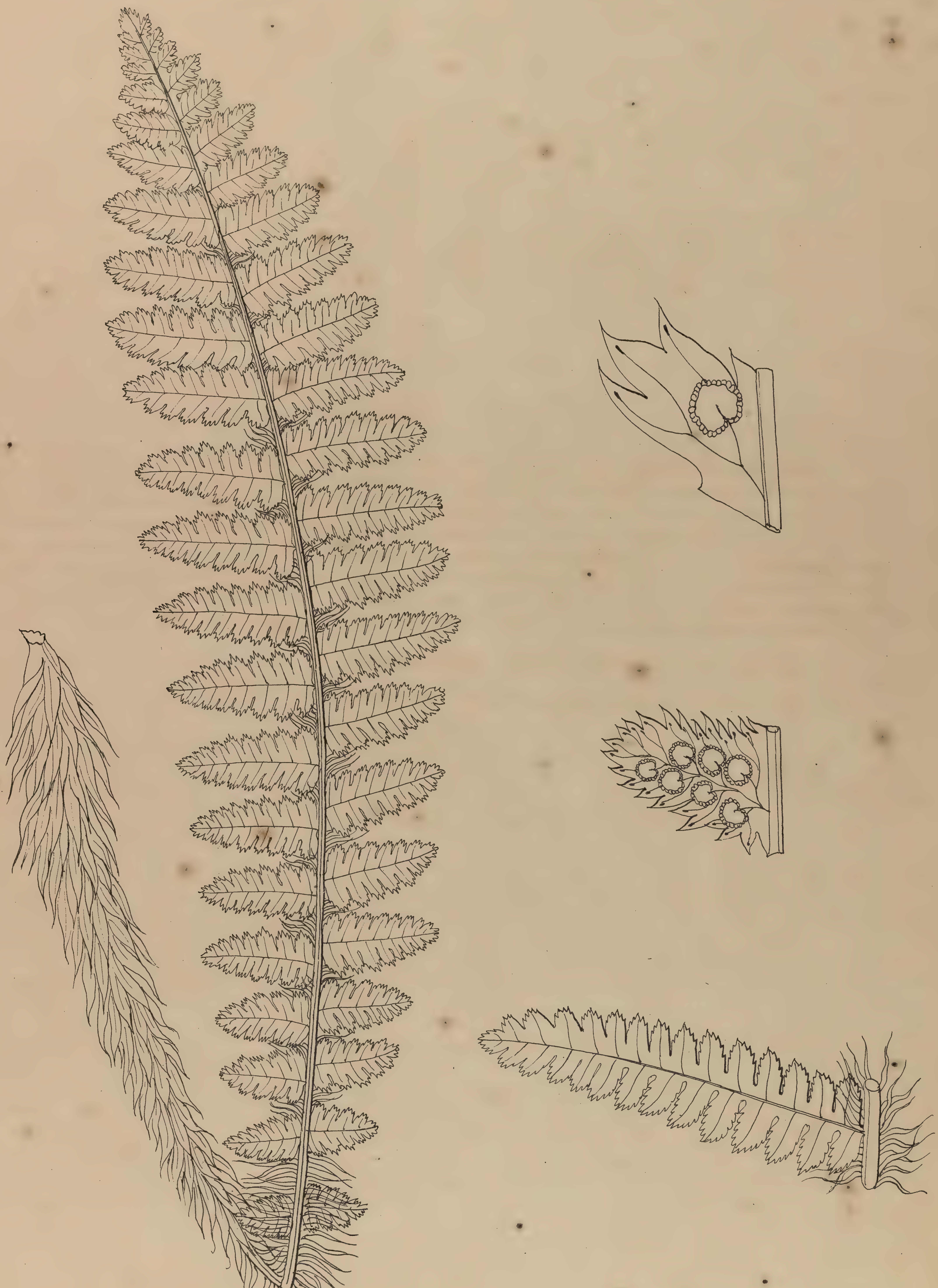
ASPIDIEÆ.

Lastrea Brunoniana (Hook.) Caudex short thick erect clothed as are all the nascent fronds with a dense mass of large subulato-lanceolate brown scales $\frac{1}{2}$-$\frac{3}{4}$ of an inch long, stipites tufted 4 inches to a span long, swollen at the base and as well as the (usually) black rachis squamose with long dark-brown glossy lanceolato-subulate patent flexuose scales mixed with others quite setiform, fronds subcoriaceo-membranaceous a span to 12-14 inches long, 2 inches broad, moderately attenuated at the base, very obtuse at the apex oblong-lanceolate pinnate, pinnæ approximate, sessile horizontally patent oblong very obtuse deeply sometimes quite to the rachis pinnatifid segments $\frac{1}{4}$ inch long, horizontal broad oblong or oval obtuse, lobato-pinnatifid the margins strongly and very sharply serrated, the teeth spreading sub-setaceous at the points, principal veins (or costules) flexuose, veinlets forked distant, sori 3-4 on each side the costule between it and the margin, involucres reniform.—*Hook. Sp. Fil.* iv. 113.—Aspidium, *Wall. Cat. n.* 344.—*Metten. Aspid. p.* 54.

The figure is taken from Sir W. Hooker's "Species Filicum.")

Hab. Kumaon, (elevation 12,000 feet,) Sikkim—Himalaya, 13,000—15,000 feet—Punjab.

PLATE No. XXXVII.



Lastrea Brononiana.
(Hook:)

Govindoo del.

G. Winchester del & lith. Madras

ASPIDIEÆ.

Lastrea melanopus (Hook.) Caudex ? stipes a little scaly below a span or more long, rather slender and as well as the rachis glossy ebeneous-black, fronds 12-14 inches long, membranaceous bright-green obsoletely subglandular-pubescent especially on the costæ pinnate, pinnæ sub-opposite sessile 4-6 inches long, 1-1½ inch wide, oblong shortly acuminated pinnatifid, segments oblong obtuse rarely subfalcate entire or nearly so, lowest pair of pinnæ semiovate subfalcate the inferior half of the pinnæ with much longer segments 1-1½ inch long, lobato-pinnatifid, veinlets forked distant, sori small on the superior branch of the veins equi-distant, between the margin and the costule, involucre small membranaceous reniform ciliated.—*Hook. Sp. Fil.* iv. 110.

The specimen figured is from Moulmein, (Rev. Parish.)

Hab. Moulmein, Amboyna ?

PLATE No. XXXVIII.

Lastrea melanopus.
(Hook:)

Govindoo del.

G. Winchester del & lith. Madras.

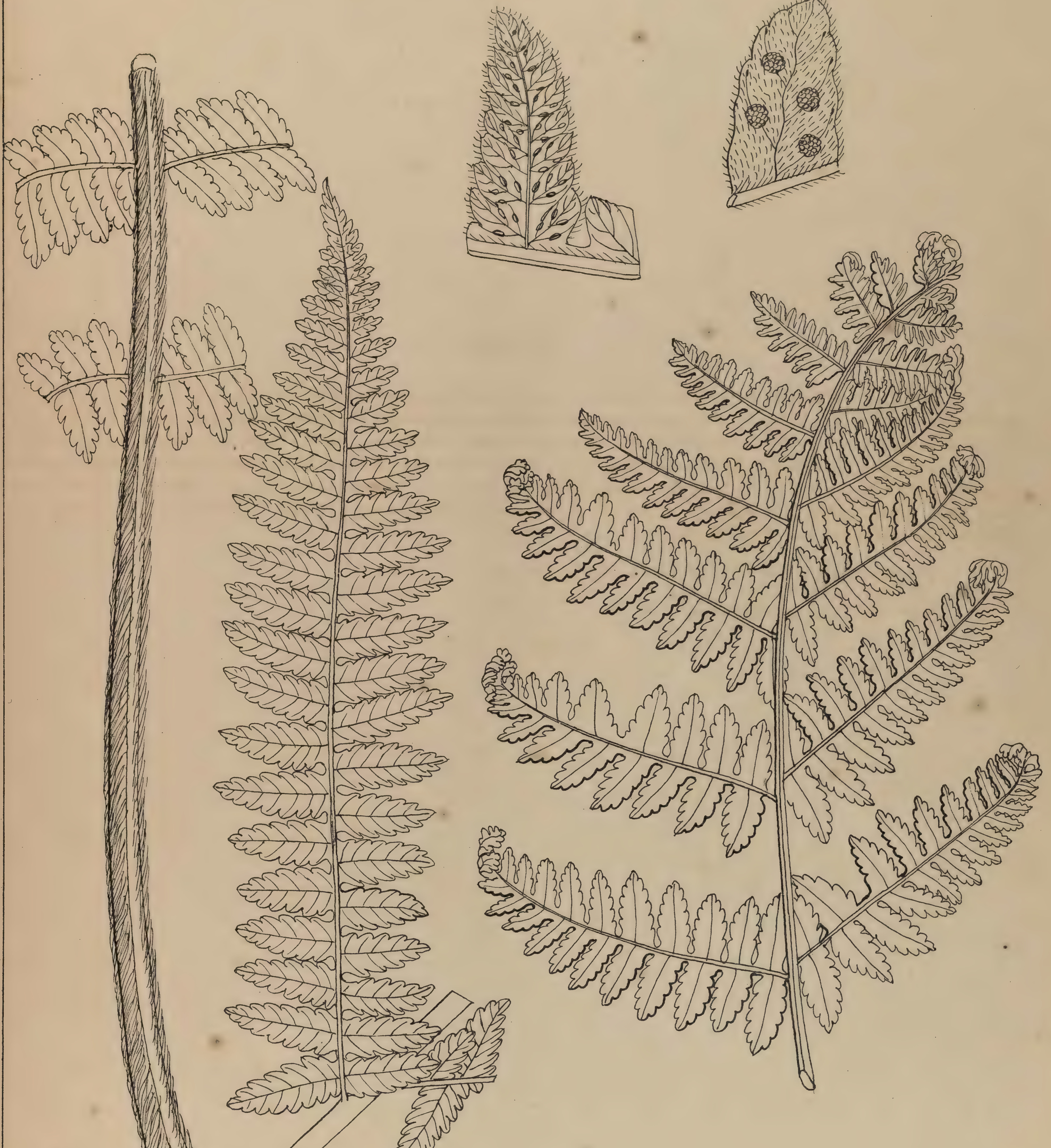
ASPIDIEÆ.

LASTREA MICROSTEGIA (Hook.) Caudex ? stipes a span long, stout tawny-brown laxly scaly, rachis and costæ stout stramineous, frond 2-2½ feet long, broad lanceolate membranaceous glabrous acuminate bi-pinnate, pinnæ sessile 4-5 of the lowest pairs shorter 4 inches long sterile and with broader and more approximate pinnæ intermediate ones 6-8 inches long, from a broad base oblong gradually acuminated, pinnules ¾ to nearly an inch long, from a broad sessile and quite adnate base pyramidally and obtusely acuminated pinnatifid about half way down to the costæ all connected at the very base by a narrow costal wing, lobes or segments small ovate blunt entire, veinlets distant, sori minute 4-6 on each lobe in two series half way between the costule at the margin, involucre very small reniform pale greenish-brown.—*Hook. Sp. Fil.* iv. 119.

The figure is taken from Sir W. Hooker's "Species Filicum."

Hab. Khasya, (temperate region.)

PLATE No. XXXIX.



Lastrea microstegia
(Hook)

Govindoo del.

G. Winchester del. & lith. Madras.

ASPIDIEÆ.

LASTREA APICIFLORA (Hook.) Caudex short stout erect clothed above with subulate scales, stipites stout a span to a foot and more long, scaly with appressed lanceolate scales at the base the rest and the stout very straight rachis clothed with numerous close-pressed scales varying in shape from small-ovate to long-lanceolate, fronds 2-3-4 feet long, oblong or sub-oval lanceolate acuminate coriaceo-membranaceous pinnate, pinnæ numerous alternate horizontal subfalcate 5-6 inches long, often an inch broad from a broad sessile base oblong acuminate deeply even to the rachis pinnatifid (almost again pinnate), segments approximate parallelogram-oblong straight obtuse or retuse angulato-dentate at the apex, veinlets numerous simple or forked, sori 5-6 only at the apex of the frond, involucres firm-membranaceous reniform, costæ very paleaceous with appressed subulate scales beneath.—*Hook. Sp. Fil.* iv. 112.—Aspidium, *Wall. Cat. n.* 345.—*Metten. Aspid. p.* 54.

The specimen figured is from Sikkim, Himalaya, (Dr. Thomson.)

Hab. Nepaul, Sikkim, Himalaya, (elevation 9,000.)

PLATE No. XL.

Lastrea apiciflora
(Hook!)

Govindoo del.

G. Winchester del & lith. Madras.

ASPIDIEÆ.

Lastrea Falconeri (Hook.) Caudex? stipes a foot long very coarse and stout quite squarrose for nearly its whole length with large broad silky ferruginous soft scales mixed with smaller subulate ones, these latter only still smaller also clothe the main and secondary rachises, fronds $1\frac{1}{2}$ foot long, oblong scarcely acuminate firm rigid coriaceous slightly villous bi-pinnate, pinnæ 4-6 inches long an inch wide, erecto-patent oblong-lanceolate, pinnules sessile linear-oblong $\frac{1}{2}$-$\frac{3}{4}$ of an inch long, about half way down pinnatifid with short round entire lobes, the margins reflexed, sori rather large copious one to each lobe, involucre brown very membranaceous cordato-reniform very convex so as to be almost hemispherical.—*Hook. Sp. Fil.* iv. 123.

The figure is taken from Sir W. Hooker's "Species Filicum."

Hab. Kashmir.

PLATE No. XLI.

Lastrea Falconeri
(Hook)

Govindoo del.

G. Winchester del & lith. Madras.

ASPIDIEÆ.

LASTREA SPLENDENS (Hook.) Caudex ?—stipes 1-2 feet (and probably much more) long, $\frac{1}{2}$-$\frac{3}{4}$ inch broad especially at the base, more or less clothed with close-pressed deciduous scales dark chestnut-brown or often (as well as the principal rachis) ebeneous-black and polished, frond ample 2-4 feet long, coriaceous broad-lanceolate acuminate bi-pinnate, primary pinnæ 6 inches to more than a foot long $1\frac{1}{2}$-2 inches wide, subpetiolate oblong finely acuminated and pinnatifid at the very apex, pinnæ sessile oblong-ovate acute or generally broader at the base and subauricled above, the rest crenate or lobato-pinnatifid, the lobes short obtuse entire or dentate, veinlets 2-3 furcate sori 8-14 large conspicuous forming two lines close to the costule, involucres rather large orbicular-reniform coriaceous dark-brown often paler at the margin.—*Hook. Sp. Fil.* iv. 126.—" Lastrea splendens, *Wall.*" *in Hook. Fl. Ms. Cat. of Ind. Ferns n.* 267.—var. *β*, *angustifrons ;* smaller, stipes black or testaceous-brown, frond copiously 3-pinnate. Lastrea angustifrons, *Moore Mss.*

The specimen figured is from Sikkim, Himalaya, (Dr. Thomson.)

Hab. Sikkim, Himalaya, Bhotan Malay, Peninsula,—*Var. β*, Nepaul.

PLATE No. XLII.

Lastrea splendens
(Wall)

Govindoo del.

G. Winchester del & lith. Madras.

ASPIDIEÆ.

LASTREA PARISHII (Hook.) Caudex creeping, stipes solitary lax soft slender glabrous and quite scaleless a little downy at the summit, fronds 4-6 inches long and as much broad pale-green pellucid succulent membranaceous when dry, pubescently hairy on the costæ, pentangular-deltoid acuminate ternately tripinnate pinnatifid at the apex, primary pinnæ oblong acuminate sub-opposite deeply nearly to the rachis pinnatifid, inferior ones pinnate at the base and petioled, segments and pinnules $\frac{1}{2}$-$\frac{3}{4}$ of an inch long, strongly serrated or acutely pinnatifid and all decurrent so as to form a winged rachis-basal pair a primary pinnæ twice or thrice as large as the rest and remote from them half-ovate acuminate, the lowest basal pinnæ much longer than the rest and more compound, veinlets lax distant twice or thrice forked, sori equidistant between the costule and the margin, involucre small rotundato-reniform one of the lobes sometimes a little elongated, rachis fusco-pubescent.—*Hook. Sp. Fil.* iv. 131.

The specimen figured is from Moulmein, (Rev. Parish.)

Hab. Moulmein (shady moist places limestone rocks.)

PLATE No. XLIII.

Lastrea Parishii
(Hook)

Govindoo del

G. Winchester del & lith. Madras.

ASPIDIEÆ.

Lastrea Thelypteris (Presl.) Caudex very long, slender branched creeping black copiously rooting, stipites distant about a foot long, slender stamineous black at the base, fronds firm-membranaceous 1 2 feet long, oblong acuminated glabrous, or pubescent on the costæ beneath, pinnated, pinnæ sub-opposite patent 2-4 inches long, sessile linear-oblong acuminated pinnatifid almost to the apex and down nearly to the rachis, segments ovate or oblong acute rarely sub-falcate quite entire, veinlets simple the lower once or twice forked, sori copious nearer the recurved margin than the costule, involucres cordato- reniform with glandular hairs at the margin deciduous.—*Hook. Sp. Fil.* iv. 88.—*Hook. Brit. Ferns t.* 13.—Aspidium, *Sw. Syn. Fil. p.* 57.—*Willd. Sp. Pl.* v. *p.* 249.—*Schk. Fil. p.* 51 *t.* 52.—*Sm. Engl. Bot. t.* 400.—*Metten. Aspid. p.* 112.—*Hook. and Arn. Brit. Fil. ed.* viii. *p.* 583.—*Asa Gray, Man of Bot. p.* 526.

The specimen figured is from the Khasya Hills.

Hab. Khasya Hills, Kashmir, Manchuria, Amur.—Marshy ground throughout Europe and North America.

PLATE No. XLIV.

Lastrea Thelypteris
(Presl)

Govindoo del. G. Winchester del. & lith. Madras.

ASPIDIEÆ.

CYRTOMIUM. (See "Ferns of Southern India," p. 41.)

CYRTOMIUM CADUCUM (Wall.) Caudex sub-erect stout, stipites a foot and more long, stramineous very paleaceous with black large lanceolate scales below with a brown edge above these are broader membranaceous lax brown ones, fronds coriaceous 1-1½ foot long, broad-lanceolate acuminate pinnated (or sub-bi-pinnate,) pinnæ numerous 3-5 inches long, ½ an inch to an inch wide, falcato-lanceolate acuminated unequally so at the base, superior base truncated and dilated with a more or less distinct obtuse or acute auricle acutely subaristato-serrated not unfrequently lobato-pinnatifid and in some inferior pinnæ quite pinnated with obovate rather obtuse pinnules, veins copious approximate erecto-patent pinnate free or with the veinlets more or less combined forming elongated areoles generally including a long free veinlet and sometimes the whole frond is bi-pinnate and the veinlets are then always free, and the plant has no very distant resemblance to some forms of *Polystichum aculeatum,* sori large scattered, involucres very conspicuous orbicular peltate but sometimes with a small sinus.—*Hook. Sp. Fil.* iv 39.—*Wall. Cat. n.* 381.—*Hook. et. Grev. Ic. Fil. t.* 171.—*Metten. Aspid. p.* 35.—Cyrtomium, *Pr. Tent. Pterid. p.* 77.—*Moore Ind. Fil. p.* 276, *(excluding the S. American stations).*—Lastrea Hookeriana, *Pr. Tent. Pterid. p.* 77.

The specimen figured is from the Khasya Hills, (Dr. Thomson.)

Hab. Nepaul, Sikkim, Khasya, Assam, Bhootan.

PLATE No. XLV.

Cyrtomium caducum
(Wall.)

Govindoo del.

G. Winchester del & lith. Madras.

ASPIDIEÆ.

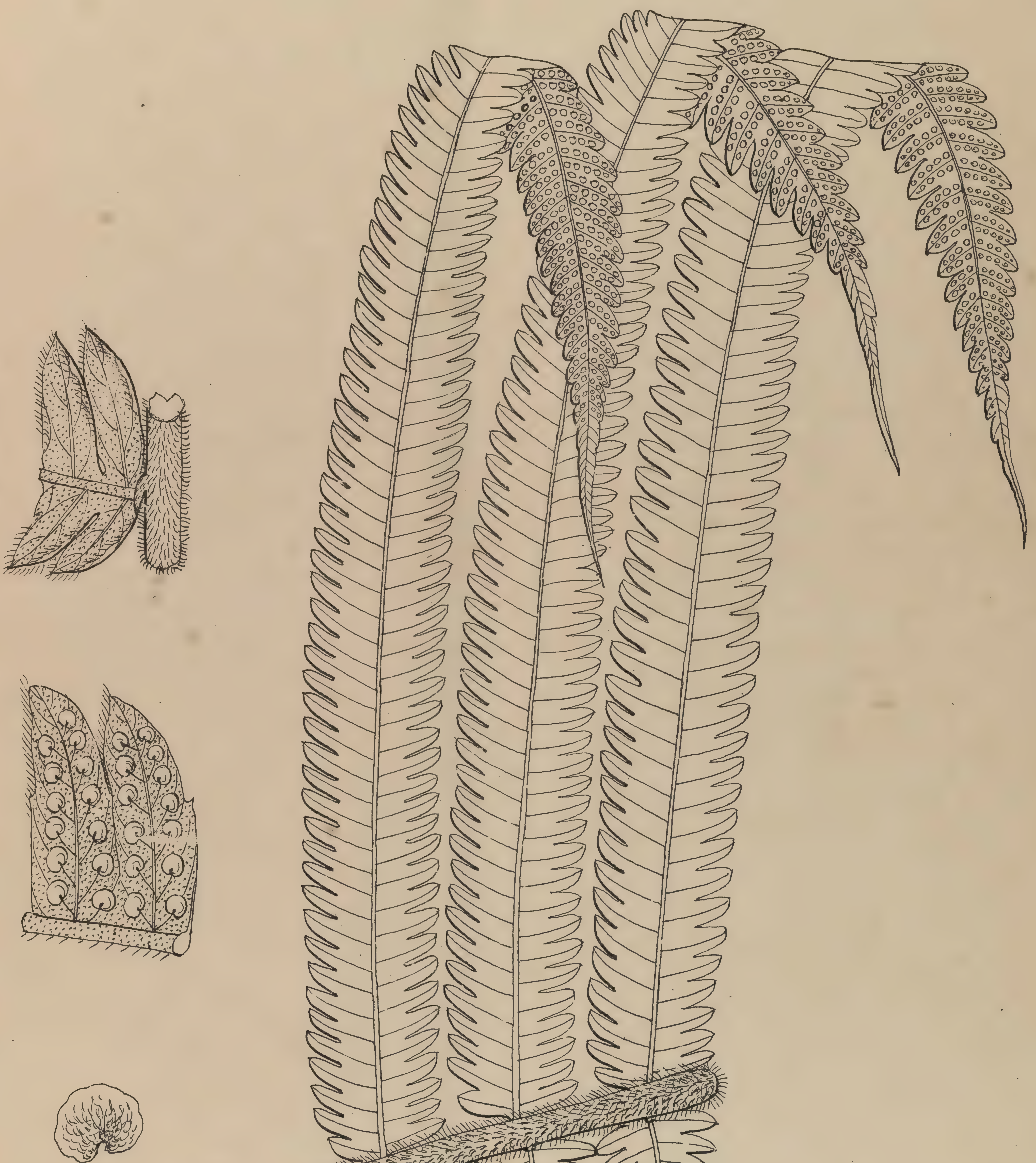
NEPHRODIUM. (See "Ferns of Southern India," p. 29.)

NEPHRODIUM HIRSUTUM (J. Sm.) Stipes and principal portion of the rachis villous with long soft close-pressed hairs, fronds 3-4 feet long, ovato-lanceolate acuminate membranaceous, 1½ foot and more wide pinnated slightly hairy on the costa above glabrous and minutely glanduloso-resiniferous beneath, pinnæ very numerous approximate sessile 10 inches long, in the broadest part of the frond and nearly an inch wide, linear oblong finely acuminate truncated at the base uniformly pinnatifid about half way down to the costa, at the base beneath on the rachis is a large conspicuous disciform scale or gland chiefly present on the lower half of the frond, segments ovato-oblong sub-falcate entire rather obtuse, one or two of the lowest pairs of veinlets combined, sori most copious on the upper half of the frond near the middle of all the veinlets, involucres glabrous.—*Hook. Sp. Fil.* iv. 170.—*J. Sm. in Hook. Journ. Bot.* iii. *p.* 412, *(name only.)—Pr. Epimel Bot. p.* 48.—Aspid, *Metten. Aspid. p.* 107.

The figure is taken from Sir W. Hooker's "Species Filicum."

Hab. Assam, Luzon.

PLATE No. XLVI.



Nephrodium hirsutum
(J. Sm:)

Govindoo del.

G. Winchester del & lith. Madras.

ASPIDIEÆ.

SAGENIA. (See "Ferns of Southern India," p. 27.)

SAGENIA HETEROCARPA (Bedd.) Fronds coriaceo-membranaceous pinnate, pinnæ opposite or sub-opposite lanceolate entire very finely acuminate, very shortly petiolate, 6 inches long by 1½ inch wide, petioles furnished with a small scaly bud on the upper side at the base of the pinnæ, costa prominent, primary pinnate veins conspicuous falcate with their areoles divided into 9-12 areoles by the transverse flexuose secondary veins within which are included numerous free simple or forked veinlets, sori copious minute, indusium very various in shape generally hippocrepiform or reniform but sometimes athyrioid or asplenioid.

The specimen figured is from the Khasya Hills, (Dr. Thomson.)

My specimens are marked by Mr. Moore "*new species near S. Menyanthidis.*"

PLATE No. XLVII.

Sagenia heterocarpa. (Bedd)

Govindoo del:

G. Winchester del & lith. Madras.

ASPIDIEÆ.

SAGENIA SUBTRIPHYLLA (Hook.) (See "Ferns of Southern India," p. 81, and Plate ccxlii.)

The specimen here figured is from Moulmein, (Parish) ; it is 3 feet high and the lowest pair of pinnæ are a foot long ; it is considered by Sir William Hooker to belong to the same species as the small form found in Ceylon (Plate ccxlii. of "Ferns of Southern India.")

PLATE No. XLVIII.

Sagenia subtriphylla
(Hook.)

Govindoo del:

G. Winchester del. & lith. Madras.

LOMARIEÆ.

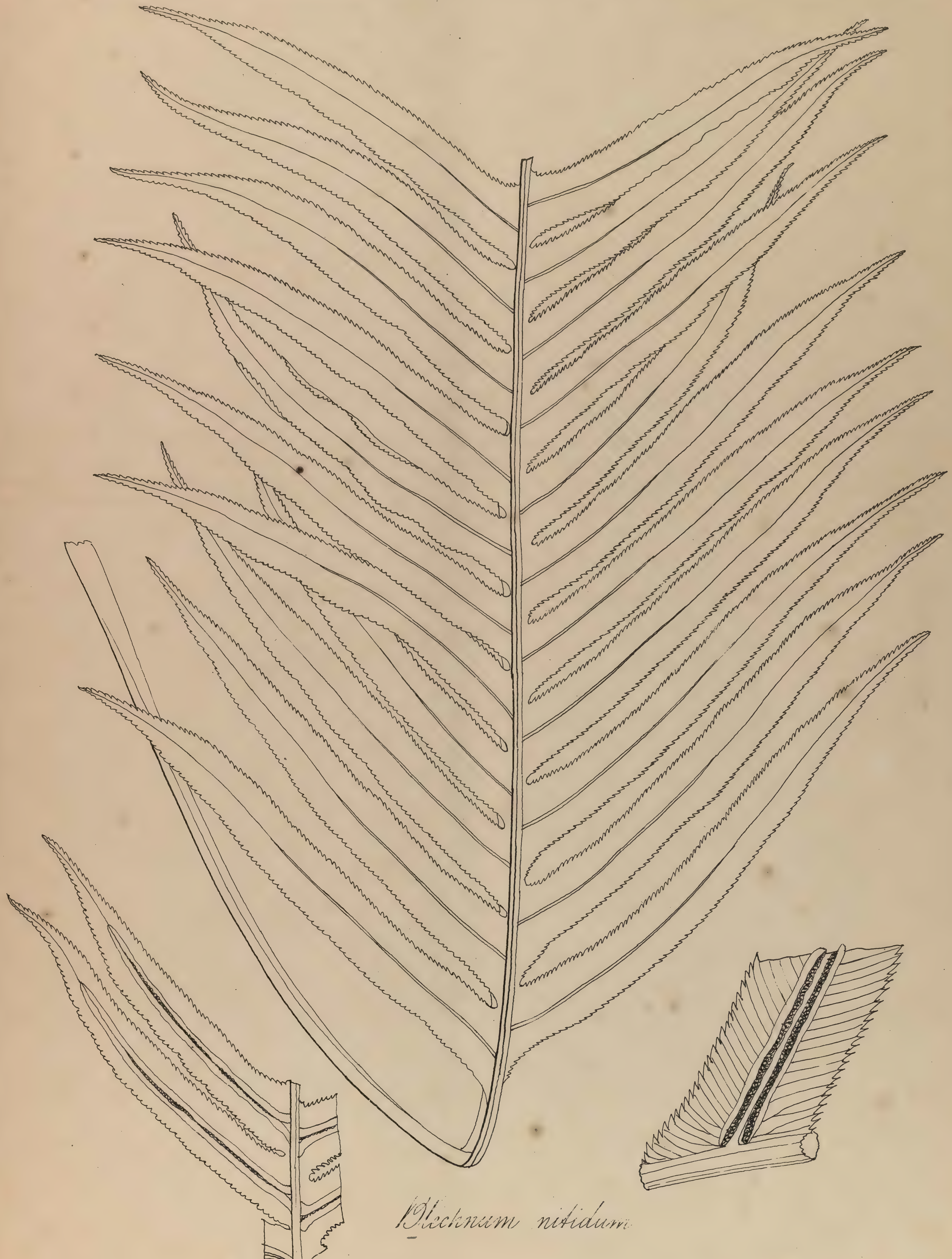
BLECHNUM. (See "Ferns of Southern India," p. 10.)

BLECHNUM NITIDUM (Pr.) Caudex ——— ? fronds ample $1\frac{1}{2}$-3 feet oblong-ovate in circumscription truncate at the base firm-coriaceous pinnatifid almost to the rachis, segments very numerous approximate linear-lanceolate acuminate more or less falcate sharply serrated, lower ones almost equal in length to those above them and free (so that the fronds are pinnated below,) veins very close simple patent, sori close to the costa continuous from the base to near the apex, stipes elongated nearly free from scales, rachis 2-furrowed beneath.—*Hook. Sp. Fil.* iii. 44.

The figure is taken from Sir W. Hooker's "Species Filicum."

Hab. Mishmee, Assam, Luzon, Isle of Sorzogon, South Brazil, Guam, Marianne Islands.

PLATE No. XLIX.



Blechnum nitidum

Govindoo del. G. Winchester del & lith. Madras.

LOMARIEÆ.

BLECHNIDUM. (Moore Index Filicum, p. clv.) (Blechni Sp. *Hooker.*)

Gen. char. *Sori* indusiate linear continuous on a transverse receptacle approximate to the costa. *Indusium* linear opening along the inward side. *Veins* springing from a central costa immersed, *venules* reticulated forming a series of large angular areoles next the costa, other narrower ones often extended nearly to the margin; ultimate *veinlets* free and thickened at the apex.

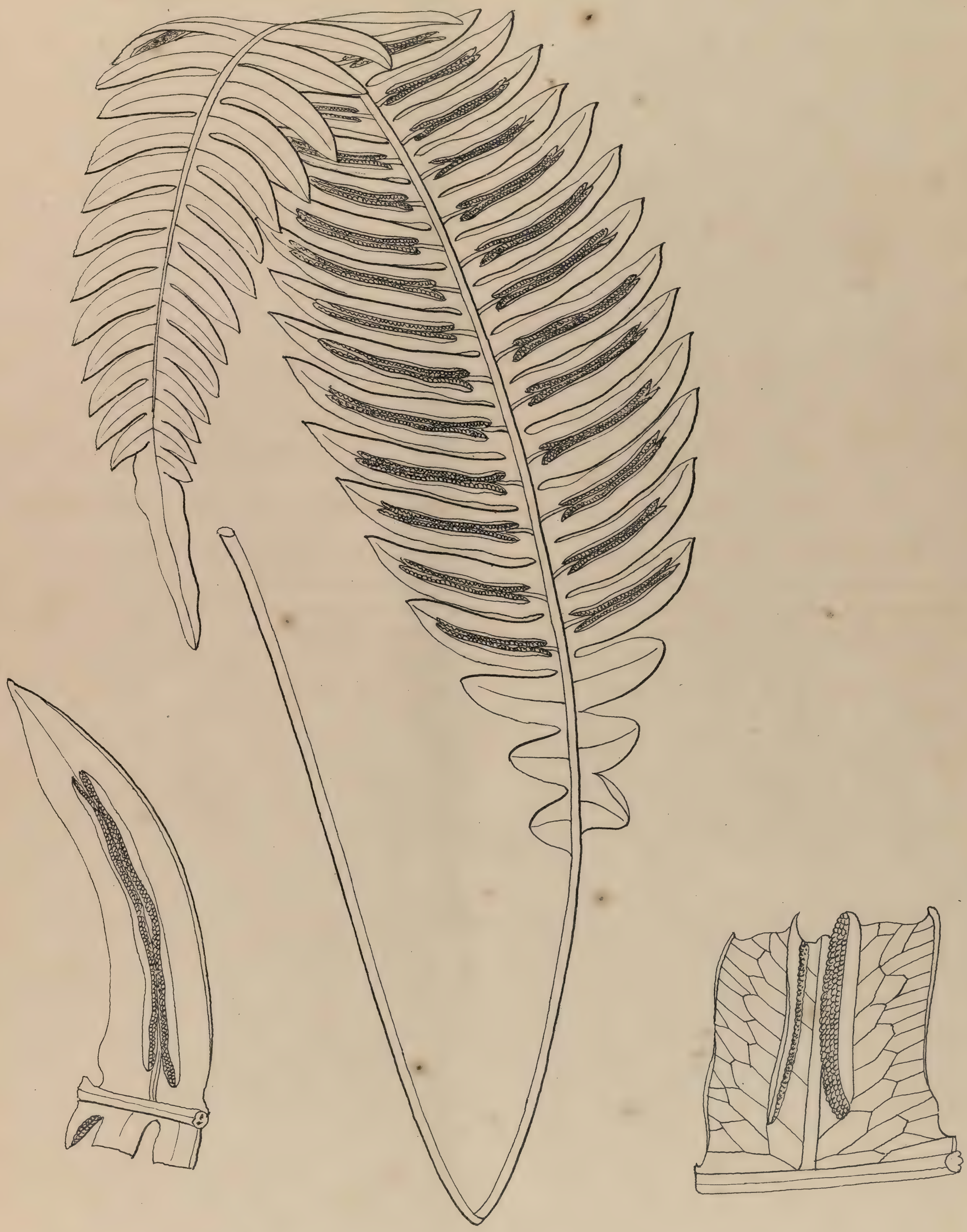
Fronds pinnatifid sub-coriaceous. This genus only differs from Blechnum in its reticulated venation. (Moore.)

BLECHNIDIUM MELANOPUS (Hook.) Caudex ——? frond spithameous (and more?) broadly falcato-lanceolate glossy sub-coriaceous pinnate, pinnæ very approximate from a rather broad adnate base linear-oblong falcate somewhat acute the margin entire narrowly revolute uppermost ones gradually confluent into a lanceolate elongated lobe the lowest 3-4 pair suddenly diminished short very obtuse sub-auriculate at the superior base, veins internal reticulated forming large angled areoles next the costa, narrower oblique ones often extending to the margin, ultimate veinlets free and clavate at their apex just within the margin, sori quite close to the costa, continuous not reaching to the apex of the pinnæ, stipes (about a span long,) and lower half of the rachis beneath black.—*Hook. Sp. Fil.* iv. 64.

The figure is taken from Sir W. Hooker's "Species Filicum."

Hab. Khasya Hills.

PLATE No. L,



Blechnidium melanopus
(Hooker)

Govindoo del. G. Winchester del & lith. Madras.

PLATYLOMEÆ.

PLAGIOGYRIA. (Kunze Schkr. Supp. ii. 61.)

(Lomariæ sp. *auct.* ;—Acrostichi sp. *Wallich.* ;—Stenochlænæ sp. *auct.*)

Gen. char. *Sori* spuriously indusiate, marginal short oblong, the *receptacles* of the same form, terminal on the veins, contiguous, the obliquely-ringed spore cases becoming laterally confluent into a linear mass on each side of the costa of the contracted pinnæ. *Indusium* (spurious) formed of the inflexed attenuated margin. *Veins* simple or forked from a central costa ; *venules* parallel free, their apices longitudinally soriferous in the fertile fronds. (Moore.)

Fronds pinnate, the fertile contracted-stipes furnished at the base with spongy glands and base of the pinnæ beneath sometimes furnished with a gland. The oblique ring to the spore cases is anomalous among the Polypodineæ and in this peculiarity the genus approaches the Cyatheineæ.

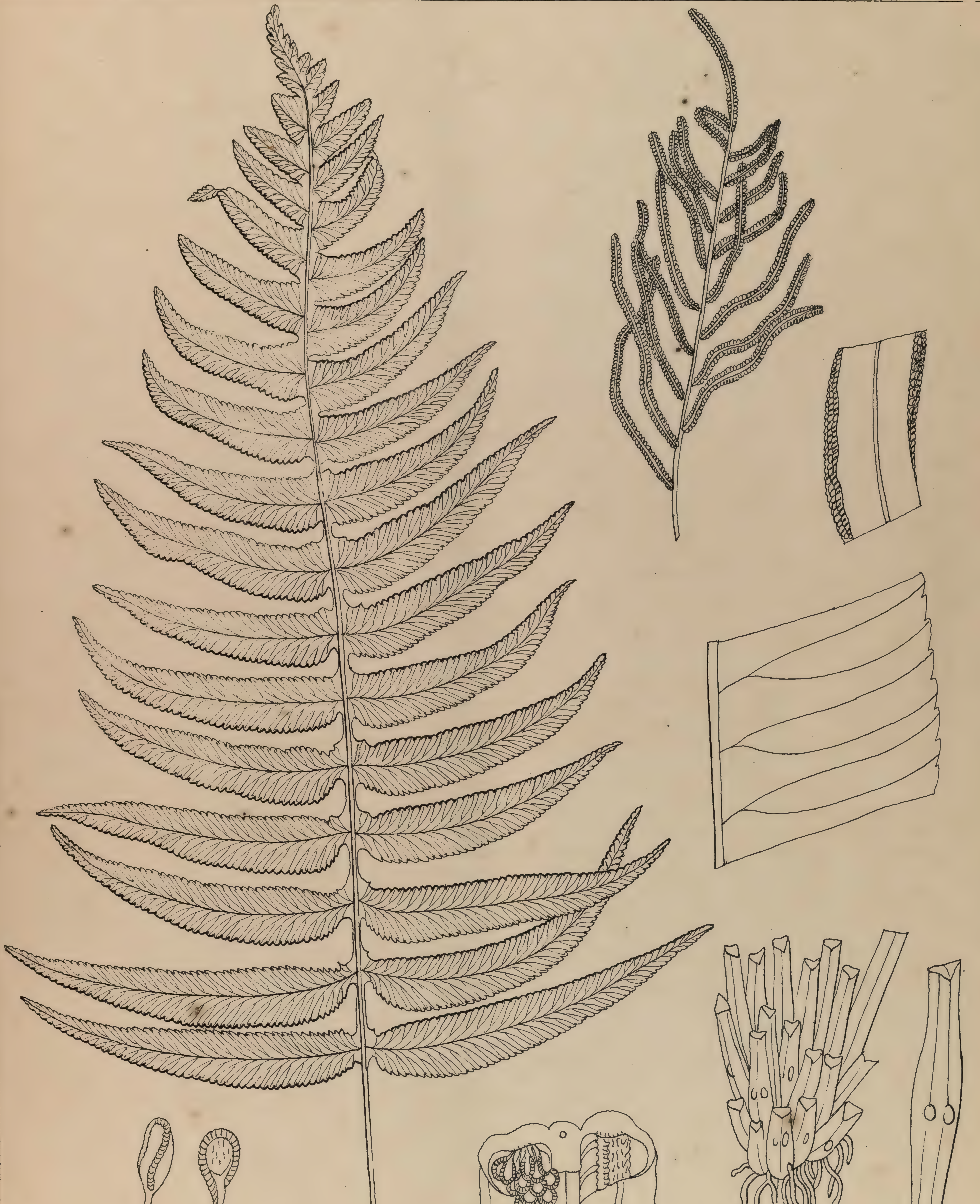
This genus is placed by most authors in the tribe Lomarieæ with which it has much natural affinity, and Sir W. Hooker makes it only a section of that genus. Mr. Moore however follows Kunze and Mettenius in separating it and points out that it can have no real structural affinity with Lomaria as the sori are arranged in short lateral contiguous lines along the ends of the veins and parallel with them as in Platylomeæ ; whereas in Lomarieæ the receptacle of the sori is linear continuous and transverse to the venation.

PLAGIOGYRIA ADNATA (Blume.) Caudex stout short, stipites cæspitose elongated brown triquetrous a span to 1½ foot long slender naked at the base dilated and subcarnose furnished with orbicular spongy glands, fronds a foot and more long, ovato-lanceolate chartaceo-membranaceous, *sterile* ones pinnatifid almost to the rachis below pinnated but all the pinnæ united by a narrow wing, segments mostly opposite distant lanceolate much acuminated more or less falcate, the inferior base round, superior base extended upwards the margins entire or obscurely toothed the apex strongly serrated, *fertile* fronds pinnated, pinnæ alternate distant linear sessile rather obtuse, sori covering the whole under side between the costa and the brown membranaceous very distinct involucre.—*Hook. Sp. Fil.* iii. 19.—*Bl. En. Fil. Jav. p.* 205.—Lomaria Griffithiana, *Hook. Herb* ;—Plagiogyria scandens, *Metten. in Plagiog. p.* 9 ?

The specimen figured is from the Khasya mountains, (Dr. Thomson.)

Hab. Java, Khasya Hills (elevation 1,000 to 4,000 feet.)

PLATE No. LI.



Plagiogyria adnata (Bl.)

Govindoo del. G. Winchester del & lith. Madras.

PLATYLOMEÆ.

PLAGIOGYRIA PYCNOPHYLLA (Kunze.) Caudex stout erect very woody and having many wiry roots, fronds fascicled, stipites sub-quadrangular 2-furrowed in front (as is the rachis) at the base dilated fleshy triquetrous subalate bearing spongy glands, fronds 1-2 and more feet long, *sterile* ones sub-chartaceous opaque brown when dry, oblong-ovate pinnated for its whole length except that the small terminal ones are confluent into a lobed (or pinnatifid) and finely acuminate and serrated apex, pinnæ horizontally patent sessile or very nearly so numerous approximate narrow oblong-lanceolate very finely almost caudately acuminate, the base very obtuse and truncate (neither dilated nor contracted) at the base beneath furnished with one or two prominent glands (sometimes wanting,) the margin very minutely serrulate, the caudate apex strongly serrated, veins numerous closely placed simple and forked, *fertile* fronds narrower pinnated, pinnæ linear obtuse on very short petioles with a gland on the under side, involucre at first vaulted conspicuous membranaceous brown at length forced back by the capsules.—*Hook. Sp. Fil.* iii. 21.—*Kze. in Bot. Zeit* iv. *p.* 143.—Acrostichum triquetrum, *Wall. Cat. n.* 23, *in part.*—Stenochlæna ? pycnophylla, *Pr. Epim. Bot. p.* 165.—Lomaria scandens, "*De Vriese in Herb. Kze.*"—L. callosa, *Fée Gen. Fil. p.* 70.—Plagiogyria adenopus.—*T. Moore. Ms.*

The specimen figured is from the Khasya Hills, (Dr. Thomson.)

Hab. Nepaul, Assam, Khasya, Bhotan, Sikkim, (7—15,000 feet), Java.

PLATE No. LII.

PLATE LII.

Plagiogyria pycnophylla (Kunze)

Govindoo del.

G. Winchester del & lith. Madras.

PLEUROGRAMMEÆ.

GYMNOPTERIS. (See "Ferns of Southern India," p. 15.)

GYMNOPTERIS TRICUSPIS (Hook.) Caudex creeping clothed with subulato-setaceous ferruginous scales, stipites 1 foot long, 1½ of the fertile frond; *sterile* frond sub-coriaceo-membranaceous sub-triangular-cordate 8-10 inches long, 10-12 inches wide at the base, including the spread of the lateral lobes, deeply trilobate, lateral lobes 5 inches or more long, 1½ inch wide horizontally patent, intermediate one 6 inches and more long, 2 inches wide, all of them oblongo-lanceolate acuminate entire unicostate, venation manifest, costules distant indistinct connected by transverse irregular curved veins forming large areoles enclosing lesser ones which have copious free branched and divaricating veinlets; *fertile* fronds much elongated but contracted tripartite nearly to the base, segments scarcely ½ an inch wide linear strap-shaped acuminate, lateral ones 9-10 inches long erecto-sub-patent, intermediate one a foot and more long, sori universal except on the costa.—*Hook. Sp. Fil.* v. 272.—Anapausia, *Moore.*

The figure is taken from Sir W. Hooker's "Species Filicum."

Hab. Sikkim—Himalaya, (hot valleys.)

PLATE No. LIII.

Gymnopteris tricuspis (Hooker)

Govindoo del. G. Winchester del & lith: Madras.

TÆNITIDEÆ.

Veins uniform reticulated, without free included veinlets.

TÆNITIS. (Willdenow. Swartz Synops Fil. 3-24.)

(Pteropsidis sp. *Desvaux ;*—Digramma *Kunze. ;*—Pteridis sp. *Auct. ;*—Antrophii *Sp. Auct.*)

Gen. char. *Sori* non-indusiate, linear, continuous or interrupted, the *receptacles* sub-marginal or medial superficial or somewhat immersed. *Veins* uniform reticulated forming elongated longitudinal or oblique areoles, without included free *veinlets.*

Fronds simple lobate or pinnate rigid, Rhizome creeping. (Moore.)

TÆNITIS BLECHNOIDES (Sw.) Caudex creeping nearly as thick as a writing-pen setose, stipites approximate 8-12 inches long, thickened and setose at the base, fronds 10 inches to 1 foot and more long (rarely when young, yet soriferous, simple) coriaceo-sub-membranaceous generally dimorphous pinnated, pinnæ a span or more long, entire at the margin ; *sterile* fronds with 5-7 broad-lanceolate suddenly acuminated pinnæ ; *fertile* pinnæ more numerous 15-16 linear-lanceolate gradually attenuated at the base, lower ones sessile, sori continuous or interrupted, veins copiously anastomosing, areoles oblique oblong veinless.—*Hook. Sp. Fil.* v. 187.—*Sw. Syn. Fil. pp.* 24 *and* 220.—*Willd. Sp. Pl.* v. *p.* 135.—*Bl. Fil. Jav. p.* 70 *t.* 28 *f.* 2 *and t.* 29.—*Fée. Vittar. p.* 26.—Tænitis pteroides, *Sckk. Fil. p.* 21 *t.* 6.—*Spreng. Analect.* iii. *p.* 374 *t.* 10 *f.* 106.—Pteris blechnoides, *Willd. Phytogr. p.* 13 *t.* 9 *f.* 3.—Var. *interrupta ;* much smaller, sori often interrupted. T. interrupta, *Wall. Cat. n.* 142.—*Hook. and Grev. Ic. Fil. t.* 62.

The specimen figured is from Burmah, (Rev. Parish.)

Hab. Malay Peninsular and Archipelago, Penang, Luzon, Borneo, Mergui and Tavoy, Singapore.

PLATE No. LIV.

Tænitis blechnoides (Sw:)

Govindoo del. G. Winchester del & lith: Madras.

TÆNITIDEÆ.

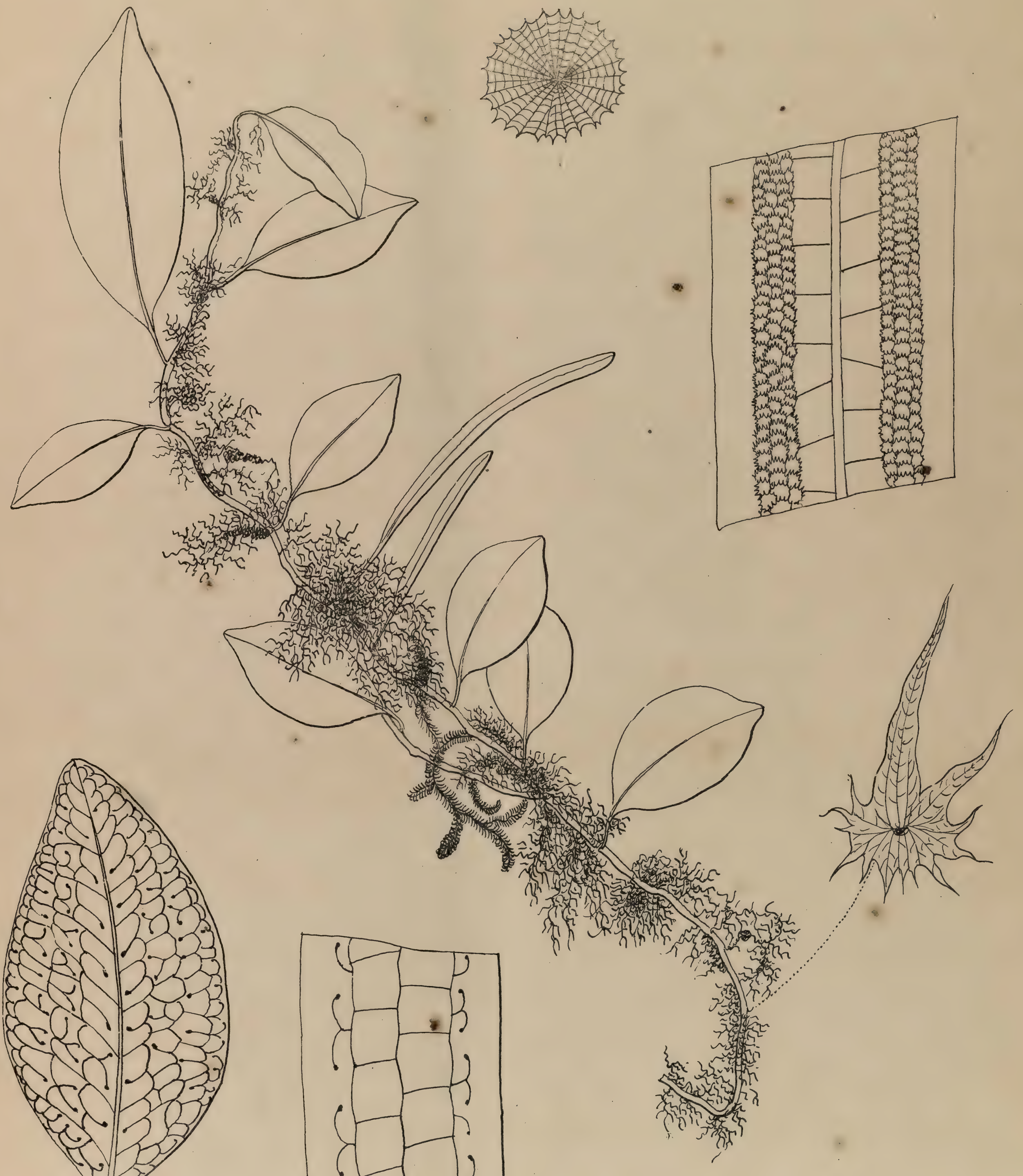
DRYMOGLOSSUM. (See "Ferns of Southern India," p. 18.)

DRYMOGLOSSUM CARNOSUM (Hook.) Caudex long filiform wiry clothed with peltate toothed scales, stipites 2 lines to 1 inch long, (in the *fertile* frond) distant slender, fronds simple of two kinds ; *sterile* one from ½ an inch, (and then generally orbicular or sub-cordate) to 2 and even 3 inches long, and then elliptical or obovate or spathulate or even lanceolate and acuminate thick and fleshy coriaceous when dry faintly costate on the under side, veins anastomosing, the areoles including free generally simple veinlets ; *fertile* fronds 1-2-2½ inches long linear-spathulate obtuse, sori linear continuous forming a line intermediate between the costa and the margin soon confluent and representing one broad band nearly as broad as the frond, when young covered by numerous peltate pedicellated scales.—Var. *major* ; fronds 1-2 inches long, sterile ones elliptical or obovate-spathulate rarely lanceolate.—*Hook. Sp. Fil.* v. 189.—*Hook. Gen. Fil. t.* 78. *A.*—*Fée Vittar. p.* 29.—Nothochlæna ? (Tænitis ?) carnosa, *Wall. Cat. n.* 131.—Lemmaphyllum, *Pr. Epim. Bot. p.* 158.—Tænitis, *Metten.*

The specimen figured is from Sikkim, (Dr. Thomson.)

Hab. Nepaul, Sikkim, Loochoo Island, and Kekeat Island, Japan, a smaller form (var. minor *Hook.*) is formed in Japan, North China, Fort Hamilton, and Formosa.

PLATE No. LV.



Drymoglossum carnosum
(Hooker)

Govindoo del.

G. Winchester del & lith Madras.

VITTARIEÆ.

VITTARIA. (See " Ferns of Southern India," p. 6.)

VITTARIA MINOR (Fée.) " Fronds linear costate obtuse tapering at the base into a short stipes, sori apicular broad exactly marginal in a deep sulcus, sporangiasters none."—Var. β. *minima,* Hook.; fronds 1 inch long less than ½ a line wide.—*Hook. Sp. Fil.* v. 183.

The specimen figured is from Moulmein, (Parish.)

Hab. Moulmein, another variety of the same species is found in Borneo and in the Philippine Islands.

PLATE No. LVI.

Vittaria minor
var β minima. (Hook!)

Govindoo del.

G. Winchester del & lith. Madras.

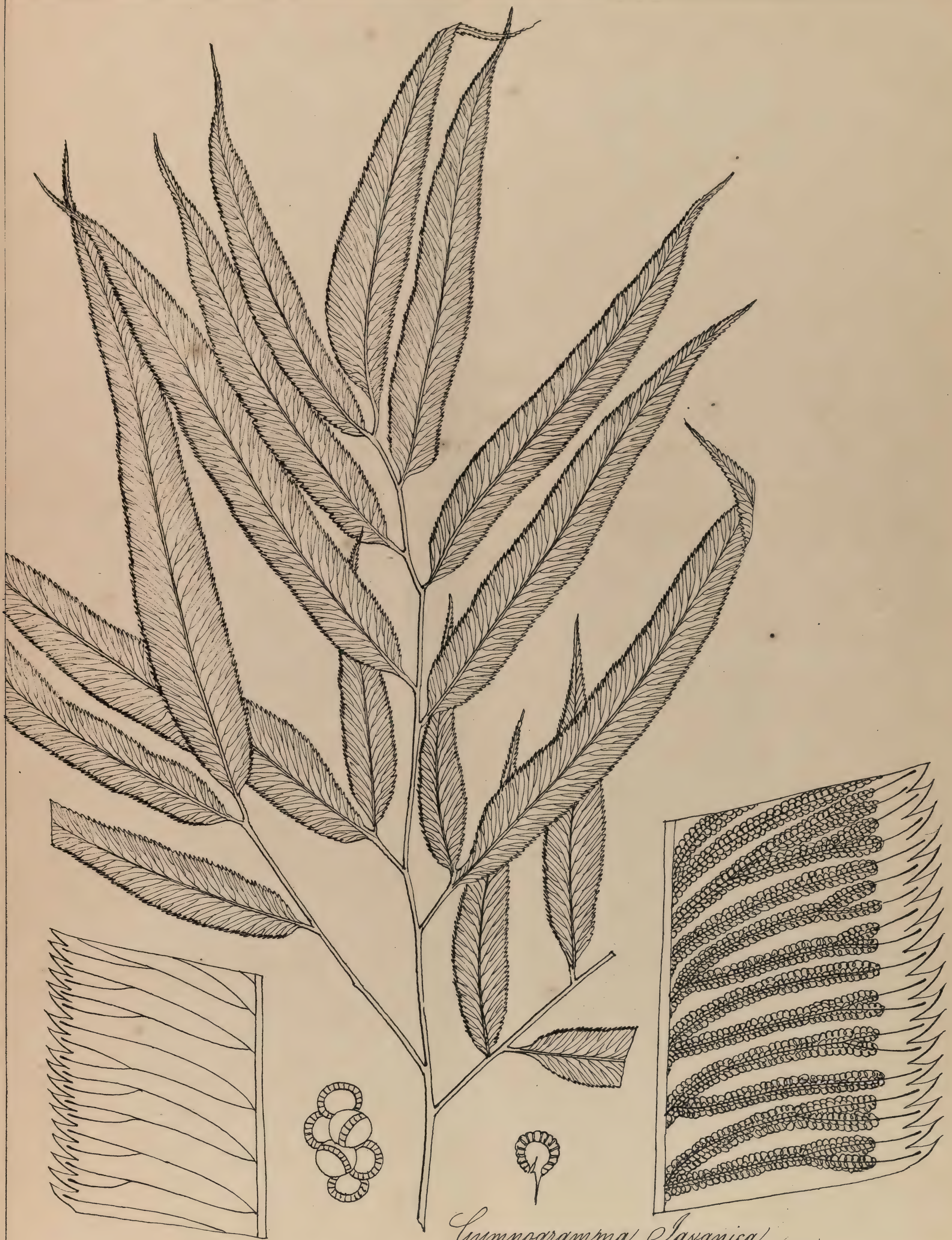
GYMNOGRAMMEÆ.

GYMNOGRAMMA. (See "Ferns of Southern India," p. 77.)

GYMNOGRAMMA JAVANICA (Bl.) (See "Ferns of Southern India," p. 77.)

The specimen here figured is from Dalhousie (Col. Dyas.,) it is very different in appearance to the Ceylon fern figured in Plate ccxxxii. of this work, being much more compound and with smaller pinnæ it is the "*G. Javanica*" of Blume, the Ceylon plant being the "*G. serrulata*" of that author, Sir W. Hooker, however, considers the two only varieties of one species.

PLATE No. LVII.



Gymnogramma Javanica (Bl.)

Govindoo del: G. Winchester del & lith. Madras.

ASPLENIEÆ.

ASPLENIUM. (See "Ferns of Southern India," p. 42.)

ASPLENIUM GRIFFITHIANUM (Hook.) Caudex short thick sub-repent, fronds cæspitose a span to nearly a foot high, an inch in diameter sub-coriaceous pale-green with scattered small scales lanceolate shortly acuminate tapering gradually below into a short winged stipes the margin rather deeply and coarsely crenato-serrate, the narrow acumen excepted, veins rather distant sub-horizontally patent, sori distant short and rather broad two-thirds the length of the vein, involucres pale-coloured firm-membranaceous.—*Hook. Sp. Fil.* iii. 87.—*Hook. Ic. Plant. t.* 928, *(or Cent. of Ferns t.* 28.*)*—*Metten. Asplen. p.* 89.

The specimen figured is from Sikkim below Darjeeling, (Dr. Thomson.)

Hab. Assam, Sikkim, Mishmee.

PLATE No. LVIII.

Asplenium Griffithianum (Hook.)

Govindoo del. G. Winchester lith: Madras.

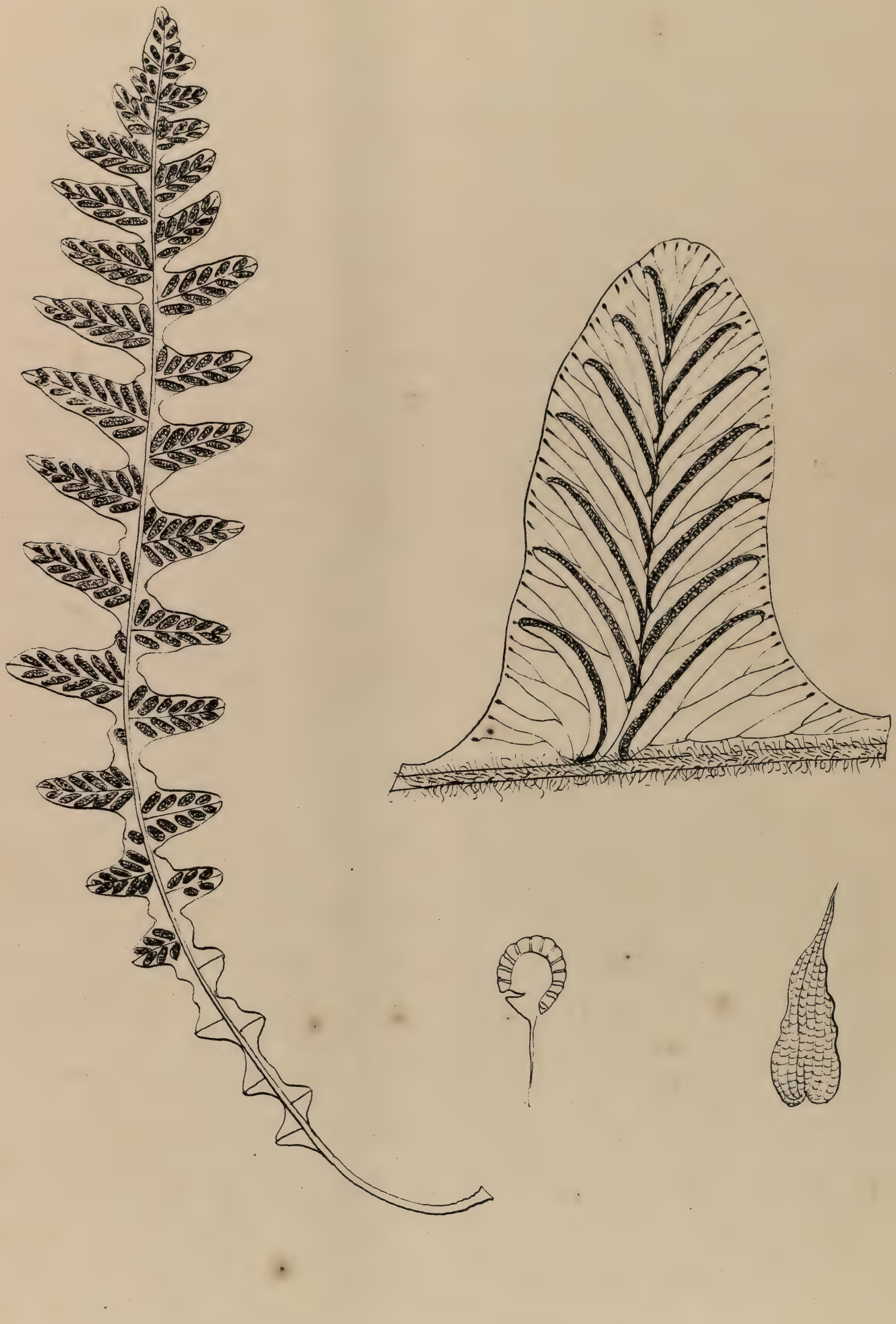
ASPLENIEÆ.

ASPLENIUM ALTERNANS (Wall.) Caudex short descending copiously rooting squamose with subulate scales as is the very short (rarely an inch long,) stipes and base of the costa beneath, fronds cæspitose about a span long, chartaceous very opaque pale-rusty green beneath glabrous lanceolate scarcely acuminate attenuated below deeply and regularly pinnatifid throughout, lobes ovate or triangular-oblong with wide sinuses obtuse quite entire, veins sub-flabellato-dichotomous all free, sori copious on all the lobes in two rows linear-oblong erecto-patent, the superior basal one parallel with the costa.—*Hook. Sp. Fil.* iii. 92.—*Wall. Cat. n.* 221.—A. Dalhousiæ, *Hook. Ic. Pl. t.* 105.—*Metten. Asplen. p.* 147.

The specimen figured is from Dalhousie, (Col. Dyas.)

Hab. North West, Himalaya 6,000 feet, Knmaon, Simla, Chumbra hill—Abyssima.

PLATE No. LIX.



Asplenium alternans
(Wall.)

Govindoo del:

G. Winchester del & lith. Madras.

ASPLENIEÆ.

ASPLENIUM SEPTENTRIONALE (Sw.) Small caudex creeping densely radiculose scarcely paleaceous, stipites numerous tufted 3-6 inches high, erect flexuose green brown at the base, fronds 1-2 inches long, coriaceous glabrous pinnated pinnæ $\frac{3}{4}$-1 inch long, long-petioled linear or linear-lanceolate subunguiculate often very acute or acuminate rarely solitary generally 2-3 alternate entire or forked, lateral segments small subulate rarely laciniated (2-3 acuminate segments), veins forked parallel, sori very ong, involucres also much elongated attached near the margin.—*Hook. Sp. Fil.* iii. 174.—*Sw. in Schrad. Journ.* ii. *p.* 283.—*Willd. Sp. Pl.* v. *p.* 307.—*Schk. Fil. p.* 62. *t.* 65.—*Engl. Bot. t.* 1,017.—*Metten. Asplen. Fil. Hort. Lips. p.* 76 *t.* 13 *f.* 21.—Moore, *Ferns Nat. Print t.* 41 *c.*—*Metten. Asplen. p.* 141.—Acropteris, *Link. Fée. Gen. Fil. p.* 77, *t.* 6. *A. f.* 1.—Amesium, *Newm.*—Acrostichum, *Linn. Sp. Pl. p.* 1,524.

Hab. Northern India, Kashmir, (elevation 9,000 feet,) Garhwal, (elevation 11,000 feet,) Europe from Norway the extreme South, Caucasus, Ural and Altai—New Mexico.

PLATE No. LX.

Asplenium septentrionale
(Sw.)

Govindoo del:

G. Winchester del & lith: Madras.

ASPLENIUM.

ASPLENIUM RUTA-MURARIA. (L.) Small, caudex short very fibrous indistinctly paleaceous, stipites tufted 2-5 inches long slender green purple below, fronds subcoriaceous about as long as the stipes deltoid bi-tripinnate, pinnules obovate or cuneate (when young simple and reniform) obtuse or truncated entire or cleft or incised at the apex, veins flabellate dichotomous, sori linear crowded sometimes elongated crowded, involucres broad erose at the margin.—*Hook. Sp. Fil.* iii. 176.—*Linn. Sp. Pl. p.* 1,541.—*Sm. Engl. Bot. t.* 150.—*Sw. Syn. Fil. p.* 85.—*Willd. Sp. Pl.* v. *p.* 75 *t.* 80 *B.*—*Moore Fil. Brit. Nat. Print t.* 41 *A.*—*Metten. Fil. Hort. Lips. p.* 143. —*Asplen. p.* 143.—**A.** murorum, *Lam.* A. murale, *Bernh. Aspl.* multicaule, *Pr.* A. Matthioli, *Gasp. et. Guss.* Scolopendrium, *Roth.* Amesium, *Newm.* Tarachia, *Pr.*

The specimen figured is from Kashmir.

Hab. Throughout Europe, North Asia, Kashmir, Thibet, &c., Cape, Algeria, N. America.

PLATE No. LXI.

Asplenium Ruta-muraria
(L.)

Govindoo del.

G. Winchester del & lith. Madras.

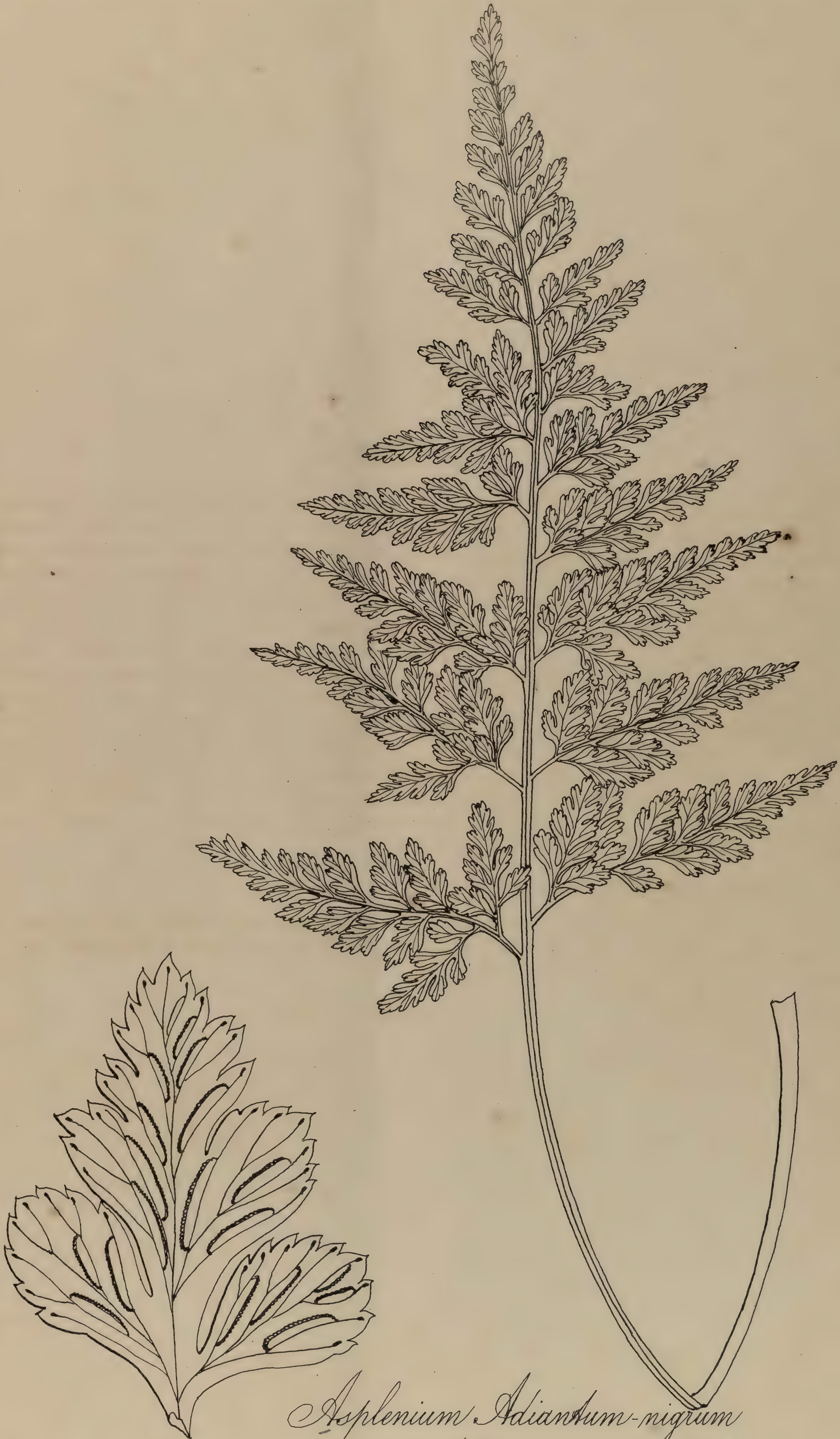
ASPLENIUM.

Asplenium Adiantum-nigrum. (L.) Caudex stout (old ones thickly clothed with the remains of old stipites) horizontal, stipites densely tufted castaneous and generally ebeneous at the base often a span and more long, frond a span to a foot and more long ovate or ovato-oblong acuminate firm membranaceo-coriaceous intent bi-tripinnate, primary pinnæ petiolate ovato-acuminate, secondary also petiolate, tertiary usually sessile from a cuneate base ovate or oblong or lanceolate or even linear more or less acuminate but obtuse inciso-pinnatifid lobes coarsely and sub-spinuloso-serrate, veins pinnated erecto-patent, sori copious approximate linear-oblong at length confluent, involucres firm-membranaceous pale brown entire, rachises alate.—*Hook. Sp. Fil.* iii. 187.—*Linn. Sp. Pl. p.* 1,541.—*Sw. Syn. Fil. p.* 84.—*Willd. Sp. Pl.* v. *p.* 346.—*Schk. Fil. p.* 74 *t.* 80 *A.*—*Engl. Bot. t.* 1,950.—*Metten. Asplen. p.* 144.—*Moore Ferns. Nat. Print t.* 36.—*Moore Ind. Fil. p.* 109.—A. Oreopteris, L. (according to Moore ; but Mettenius refers this to the var. *acutum*). A. argutum, *Klfs. En. Fil. p.* 176 ;—A. humile, *Bl. En. Fil. Jav. p.* 185 ;—A. Silesiacum, *Milde* ;—A. nigrum, *Bernh.* ;—A. luridum, *Salisb.* ;—A. capense, L. *(fide Moore)* Tarachia, Pr.—Var. β *acutum*, Pollin. ; pinnæ pinnules and segments narrower often linear acute or acuminate. *Moore Brit. Ferns. Nat. Print t.* 37;—A. acutum *Bory, in Willd. Sp. Pl.* v. *p.* 347 ;—A. productum, *Lowe, Trans. Cambr. Phil. Soc.* vi. *p.* 524.—Var. γ *obtusum*, Moore ; pinnules and lobes very broad more acutely dentate ;—A. Ad. nigr. v. Capense, *Schlecht. Adumbr. Fil. Cap. p.* 31 *t.* 18 ;—A. obtusum, *Kit. Willd. Sp. Pl.* v. *p.* 341 ;—A. cuneifolium, *Vis. Fil. Ital. Fragm. p.* 16 *t.* 18 ;—A. Serpentini, *Tausch. and Henfl. Aspl. Europ. p.* 81 *t.* 1, 2.—Mr. Moore refers hither, A. fissum, *Weinm.* ;—A. forsteri and A. novum, *Sadl.* ;—A. incisum, *Opiz* ;—A. multicaule, *Scholtz.* and A. tabulare, *Schrad.*

The specimen figured is from Simla.

Hab. All three varieties are found throughout Europe and Northern Asia, N. and S. Africa, Madeira, the Canaries, Azores, Cape de Verd Islands, St. Helena, Abyssinia, Java. In Northern India they are found in Afghanistan and at Mussoorie, Kashmir, and Simla.

PLATE No. LXII.



Asplenium Adiantum-nigrum
(L)

Govindoo del. G. Winchester del & lith. Madras.

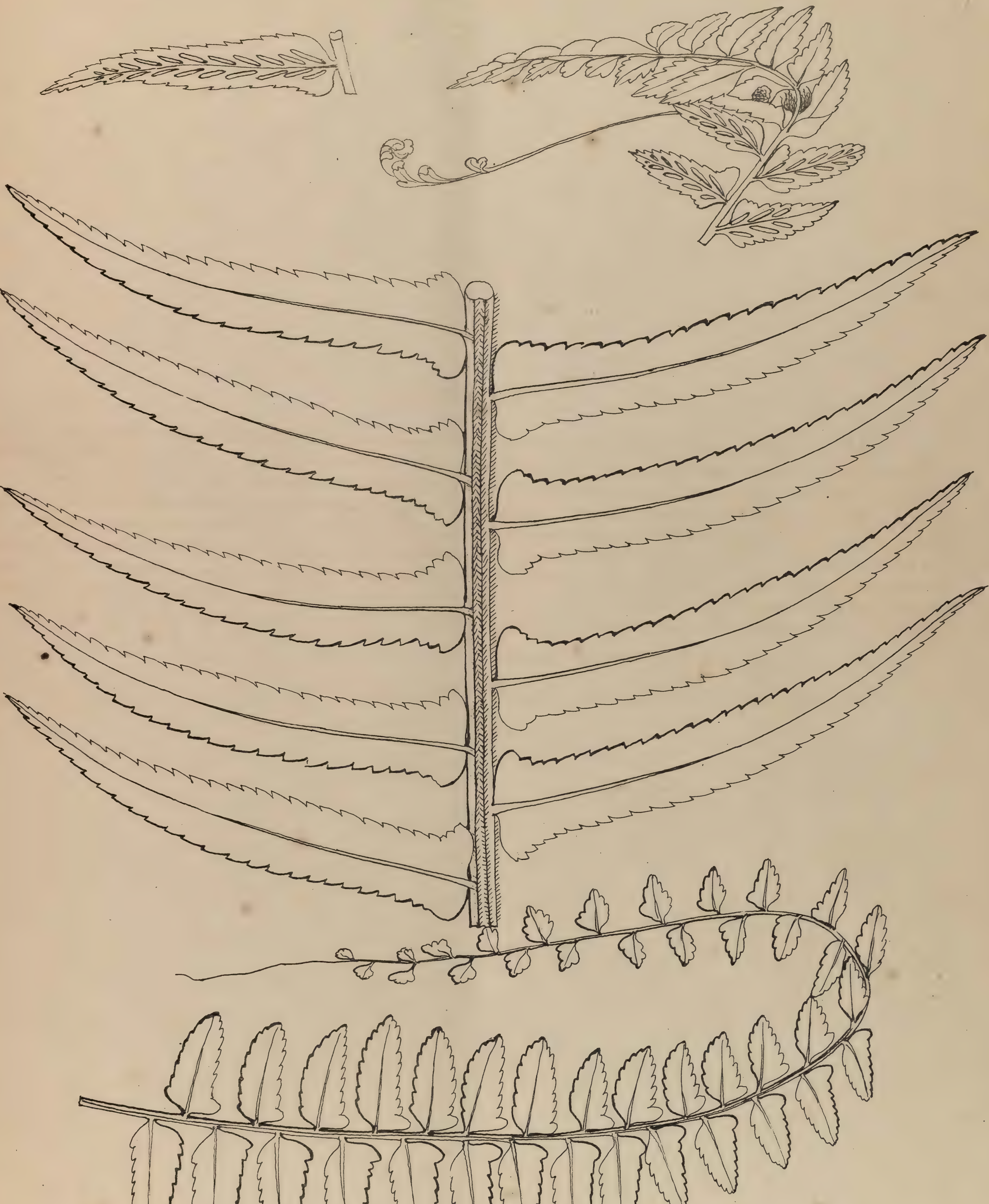
ASPLENIUM.

Asplenium longissimum. (Bl.) Caudex stout woody paleaceous with rather long brown lanceolato-subulate scales, stipites and rachis dark lurid-black deciduously villoso-paleaceous, fronds very variable in length 1-3 and more feet elongato-oblong-lanceolate subcoriaceous opaque dark-brown (when dry) the extremity running out apparently with a continuous growth to a long narrow acumen rooting and bearing young plants at the apex pinnated, pinnæ 3-4 inches long very numerous horizontal sessile moderately distant from a broad ($\frac{1}{2}$-$\frac{3}{4}$ inch) cuneated base lanceolate gradually and much acuminated more or less strongly serrated especially above the middle, superior base with a triangular auricle, inferior base often also auricled or with an angle, inferior pinnæ gradually smaller and very obtuse, veins erecto-patent once or twice forked, sori copious close-placed regular nearer the costa than the margin, involucre subcoriaceous rigid narrow brown.— *Hook. Sp. Fil.* iii. 148.—*Bl. En. Fil. Jav. p.* 178.—*Metten. Asplen. p.* 147.—Aspl. flagelliferum, *Wall. Cat. n.* 219, (*where, for* "Sylhet," read Singapore) Aspl. sordidum, *Kze. Bot. Zeit.* vi. *p.* 174, *(fide Metten.).*

The figure is taken from Sir W. Hooker's "Species Filicum."

Hab. Mergui, Birmah, Singapore, Malacca, Java, Mauritius, and Diego Garcia.

PLATE No. LXIII.



Asplenium longissimum
(Blume)

Govindoo del:

C. Winchester del & lith. Madras.

ASPLENIUM.

ASPLENIUM VIRIDE. (Huds.) Caudices short creeping clothed with black subulate scales forming a closely compacted rooting mass, stipites densely coespitose 2-4 inches long slender glossy black below then castaneous nearer the fronds stramineous, fronds 3-5 rarely 6 inches long linear-lanceolate membranaceous bright-green (as is the slender rachis) glabrous scarcely acuminated pinnated, pinnæ 2-3 lines long rather distant pinnate all petiolate rhombeo-ovate obtuse more or less obliquely cuneate at the base deeply but rather irregularly crenate. Scarcely at all lobed, veins sub-flabellate, sori 2-4 near the disc remote from the margin oblong oblique at length confluent, involucres very thin membranaceous soon obliterated.—*Hook. Sp. Fil.* iii. 144.—*Huds. Fl. Ang. p.* 453.—*Sw. Syn. Fil. p.* 80.—*Willd. Sp. Pl.* v. *p.* 332.—*Schk. Fil. p.* 68 *t.* 73.—*Eng. Bot. t.* 392.—*Moore and Lindl. Ferns, Nat. Print t.* 40.—*Metten. Asplen. p.* 139 ;—A. Trichomanes, var. ramosum, *Linn. Sp. Pl. p.* 1,541 ;—A. intermedium, *Pr. Del. Prag.* 1-233.—*Tent. Pterid. t.* 3. *f.* 22 ;—A. umbrosum, *Vill.*

Hab. Throughout Europe, Himalayas, Kumaon (alt. 12,000 feet), N. America.

PLATE No. LXIV.

Asplenium viride
(Huds:)

Govindoo del: G. Winchester del. & Lith. Madras.

ASPLENIUM.

Asplenium bulbiferum. (Forst.) Caudex stout horizontal or oblique paleaceous with long linear-subulate scales at the summit, stipites lurid-green 4 inches to a foot long sometimes deciduously and sparsely paleaceous semiterete or broad and compressed, fronds sub-coriaceo-membranaceous, yet flaccid 1-3 feet long ovato-lanceolate erect or pendulous dark-green pinnato-pinnatifid with lobes entire or toothed or usually bi-rarely tripinnate, primary pinnæ often proliferous 6 inches long petiolate more or less lanceolate acuminated, pinnules in the normal form from ½ an inch to 2 inches long elliptical-ovate and more or less pinnatifid with ewasplenioid sori, or the pinnules are narrower elongated deeply divided, and the majority of them quite dareoid, sori oblique, involucres firm greenish, rachises compressed.—*Hook. Sp. Fil.* iii. 196.—*Forst. Prodr. p.* 80.—*Sw. Syn. Fil. pp.* 83 *and* 278.—*Schk. Fil. t.* 79.—*Hook. Ic. Pl. t.* 423.—*Hombr. et. Jacq. Voy. Pôl. Sud. Bot. t.* 3. *f.* i.—*Hook. fil. Fl. N. Zeal.* ii. *p.* 34.—*Fl. Tasm.* ii. *p.* 146.—*Metten. Asplen. p.* 106.—*Moore Ind. Fil. p.* 118 ; Cænopteris, *Desv.* ;—Aspl. viridans, *Labill. Sert. Aust. Caled.* i. *p.* 2. *t.* 2 ;—*Metten. Asplen. p.* 107 ; —A. bullatum, *Wall. Cat. n.* 215 ;—Athyrium macrocarpum, *Fée. Gen. Fil. p.* 188 ;—Asplen., *Moore.*

The specimen figured is from Sikkim (Dr. Thomson), the plate has been named A. bullatum (Wall.), and should be altered to A. bulliferum. Forst, as that is an older name.

Hab. New Zealand, Australia, Nepaul, Sikkim, Bhotan, Penang, South America.

PLATE No. LXV.

Govindoo del:

G. Winchester del. & lith: Madras.

ASPLENIEÆ.

THAMNOPTERIS. (See "Ferns of Southern India," p. 42.)

Thamnopteris Grevillei. (Wall.) Fronds tufted subcoriaceous $1\frac{1}{2}$ foot long pale-whitish-green when dry, spathulate (or oblong-ovate finely acuminate suddenly contracted at the base and decurrent upon a long winged stipes) veins compact horizontally patent, sori linear very narrow occupying the upper half or the entire broad portion of the frond rather distant.—*Hook. Sp. Fil.* iii. 80. —*Wall. Cat. n.* 1,036.—*Hook. et. Grev. Ic. Fil. t.* 128.—*Moore, Ind. Fil. p.* 50.

The specimen figured is from Birmah, (Captain the Honorable J. Dormer.)- given to him by me - C. Parish.

Hab. Birmah, Tavoy, Mishmee.

PLATE No. LXVI.

Thamnopteris Grevillei. (Wall)

Govindoo del:

G. Winchester del. & lith. Madras.

ASPLENIEÆ.

ATHYRIUM. (See "Ferns of Southern India," p. 50.)

ATHYRIUM OXYPHYLLUM. (Hook.) Caudex very stout 1-2 inches in diameter ascending clothed with numerous persistent stipites of former years villous rather than paleaceous at the summit with very long ($\frac{3}{4}$ of an inch) erect subflexuose ferruginous scales, stipites clustered 4 inches to a foot long stramineous glossy below shaggy with the same scales as crown the caudex, fronds 6-18 inches long from broad-lanceolate to sub-deltoideo-ovate subcoriaceous generally much acuminated bi-rarely tri-pinnate, primary pinnæ 3-8 inches in length often flexuose from a broad base lanceolate sometimes spinulose on the costa above generally much acuminated and sharply serrated only at the apex, pinnules from an oblique cuneated base tapering into a distinct petiolule ovato-lanceolate acute lobato-pinnatifid at the margin auricled at the superior base serrated towards the apex, the lobes usually acute, sometimes the pinnules are again pinnated, veins pinnated, sori in two rows one on each veinlet near the middle, varying much in size rarely straight mostly curved or crescent-shaped, involucres often hippocrepiform brown membranaceous erose or fringed at the margin sometimes deciduous.—*Hook. Sp. Fil.* iii. 221 ;—Polypodium oxyphyllum, *Wall. Cat. p.* 324 ;—Athyrium, *Moore Ind. Fil. p,* 126 ;—Aspidium eburneum, *Wall. Cat. p.* 389 ;—(pinnæ and pinnules more slender), Asplenium, *J. Sm. Cat. Cult. Ferns p.* 6.—*Metten. Asplen. p.* 194 ; —Lastrea, *J. Sm. Cat. Cult. Ferns p.* 47 ;—Aspidium squarrosum, *Wall. Cat. n.* 356 ;—(Moore refers this to his *Athyrium foliolosum*). —Polypodium drepanopterum, *Kze. in Linnæa.* xxiii. *p.* 318 ;—Aspidium, *Braun. Ind. Sem. Berol.* 1856.—*Metten Fil. Hort. Lips. p.* 93. *t.* 19. *f.* 1-4.

The specimen figured is from the Khasya Hills, (Dr. Thomson.)

Hab. Nepaul, Assam, Khasya, Eastern Himalaya, Bhotan.

PLATE No. LXVII.

Athyricum oxyphyllum
(Wall:)

Govindoo del:

G. Winchester del & lith: Madras.

ASPLENIEÆ.

DIPLAZIUM. (See "Ferns of Southern India," p. 53.)

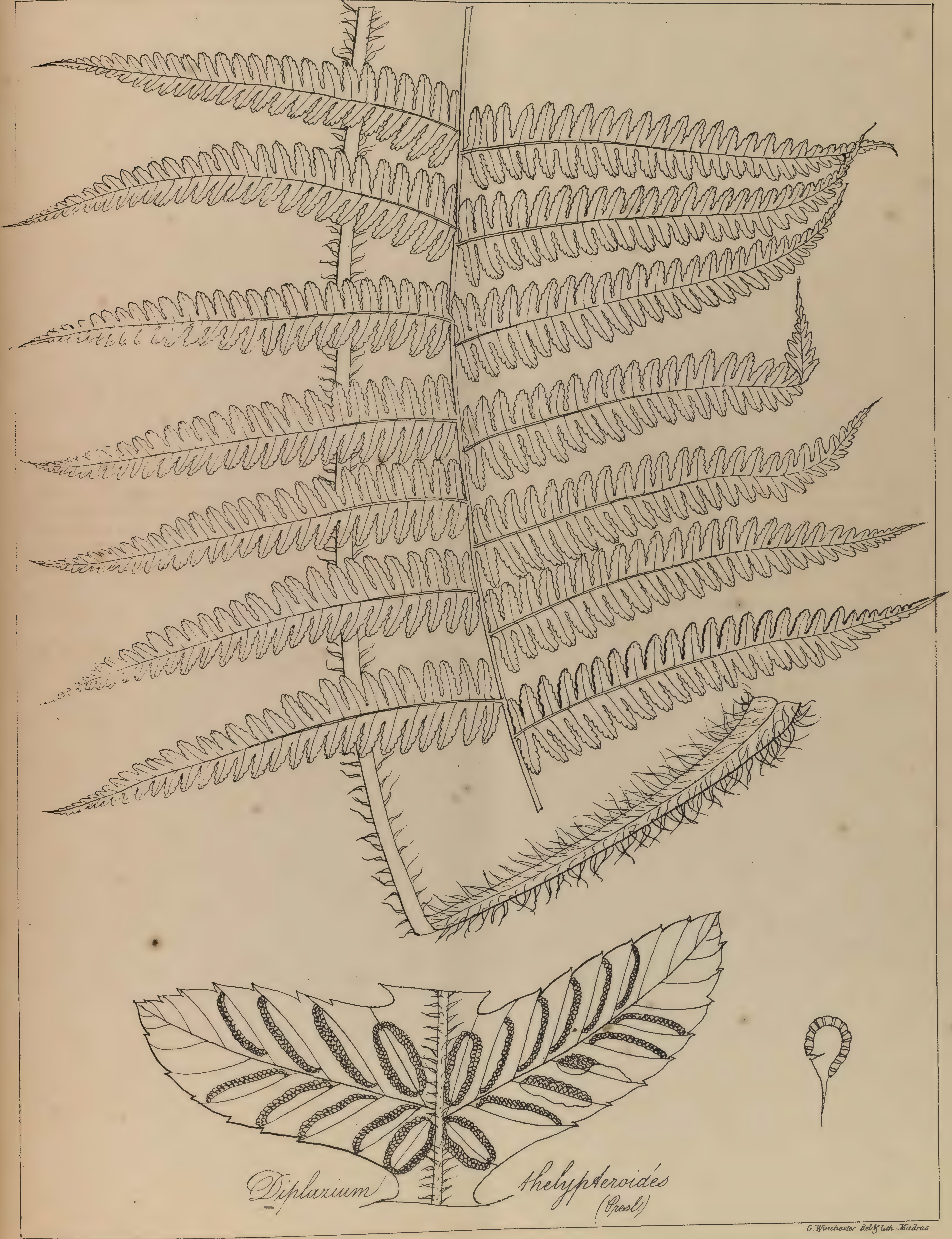
DIPLAZIUM THELYPTEROIDES. (Mich.) Caudex stout creeping, stipites rather distant on the caudex a foot or more long stramineous glossy brown below, fronds 1-3 feet long submembranaceous dark-green lanceolate-acuminate firm pinnate, pinnæ subremote horizontal 3-4 inches long sessile from a broad base linear-oblong acuminated deeply almost to the rachis pinnatifid, segments oblong-elliptical ½ of an inch long horizontal entire or obscurely serrated very obtuse, veins mostly simple-pinnated, sori linear-oblong in two series approximate upon the segments soon confluent, involucres convex pale firm-membranaceous entire convex at the margin lower ones generally double, rachis stramineous.—*Hook. Sp. Fil.* iii. 229.—*Mich. Fl. Bor. Am.* ii. *p.* 265.—*Willd. Sp. Pl.* v. *p.* 336.—*Schk. Fil. p.* 71. *t.* 76. *b.*—*Asa. Gray, Man. B. N. U. St. p.* 627.—*Metten. Fil. Hort. Lips. p.* 78.—*Asplen. p.* 184 ;—Athyrium, *Desv. Moore* ; —Diplazium, *Pr.* ;—Aspl. acrostichoides, *Sw. Syn. Fil. p.* 275.

The specimen figured is from Sikkim—Himalaya, (Dr. Thomson.)

Hab. Northern India above Simla, Sikkim—Himalaya, Chinese Tartary, River Amur, North America, Canada to the middle of United States.

PLATE No. LXVIII.

PLATE LXVIII



Diplazium thelypteroides (Presl.)

Govindoo del. G. Winchester del. & lith. Madras.

DIPLAZIUM.

DIPLAZIUM FRAXINIFOLIUM. (Wall.) Caudex ascending copiously fibrous nigro-paleaceous at the apex, stipites aggregated often a foot long brown subrobust below chiefly laxly and deciduously nigrescenti-paleaceous, fronds 1-$1\frac{1}{2}$ foot long subcoriaceous firm subnitent brown when dry pinnate, pinnæ 3-11 remote petioled patent 6-10 inches long broadly oblong-lanceolate finely acuminate entirely or very obscurely serrate towards the apex subobliquely cuneate at the base, veins fasciculate twice or thrice dichotomous parallel copious all free (rarely here and there anastomosing) sori copious linear-elongate extending from the costa nearly to the margin, involucres narrow.—*Hook. Sp. Fil.* iii. 240.—*Wall. Cat. n.* 194.—*Hook. 2nd Cent. of Ferns t.* 19 ;—Diplazium, *Wall. Herb.* 1823.—*Moore Ind. Fil. p.* 133 ;—Diplazium elegans (*veins free*), *Hook. in Kew. Gard. Misc.* ix. *p.* 343.—*C. Wright, in Ringgold and Rogers's Herb of U. S. expl. exp.* ;—D. falcatum, *Don. ?*—Aspl. Donianum, *Metten. Asplen. p.* 178.

The specimen figured is from the Khasya Hills, (Dr. Thomson.)

Hab. Penang, Singapore, Khasya and Assam, Hongkong.

PLATE No. LXIX.

Diplazium fraxinifolium (Wall.)

Govindoo del.

G. Winchester del. & lith. Madras.

ASPLENIEÆ.

CALLIPTERIS. (See "Ferns of Southern India," p. 54.)

CALLIPTERIS PROLIFERA. (Bory.) Caudex "erect scaly," stipes stout 1-2 feet long deciduously scaly smooth or muricated, fronds 2-4 feet long broad-oblong acuminate subcoriaceous pinnated often with scaly proliferous axillary bulbs, pinnæ numerous large horizontally patent sessile 6-10 inches and more long often 2 inches broad sessile from a broad truncated and subcordate and on each side subauricled base oblong gradually narrower to the acute or acuminated apex, the margin entire or serrated or irregularly sinuato-lobate rarely below again pinnate with oval-oblong acute pinnæ, terminal pinnæ large hastato-triangular, broad at the base and pinnatifid with long segments entire or serrated at the acuminated apex, veins copious fasciculato-pinnate branches or veinlets uniting and anastomosing more or less copiously, forming triangular areoles next the costæ, the rest more or less elongated, sori upon all the veins and anastomising with them, involucres narrow mostly diplazioid.—A. decussatum, *Hook. Sp. Fil.* iii. 270.—*Sw. Syn. Fil. p.* 76 *and* 260.—*Willd. Sp. Pl.* v. *p.* 173.—*Metten. Asplen. p.* 173 ;—Anisogonium, *Pr. Tent. Pterid. p.* 116. *t.* 4. *f.* 13.—*Hook. Gen. Fil. p.* 56.—(Tab. A. *f.* 1-4). Aspl. proliferum, *Lam. Wall. Cat. p.* 236.—*Metten. Fil. Hort. Lips. p.* 74. *t.* 11. *f.* 7 ;—Diplazium, *Petit.* ;—Th. *Kaulf. En. Fil. p.* 182.—*Sieb. Syn. Fil. p.* 30 ;—D. bulbiferum, *Boj. in Herb. Hook.* ;—D. horridum, *Kze. Annal p.* 26 ;—D. Swartzii, *Bl. En. Fil. Jav. p.* 191 ;—D. repandum, *Bl. En. p.* 191 *and in Herb. Hook.* Aspl. spinulosum, *Bl. En. Fil. p.* 193 *and in Herb, Hook.* Aspl. spinulosum, *Bl. En. Fil. p.* 193. *et in Herb. Hook.* Callipteris, *J. Sm.* Asplenium, *Metten. Asplen. p.* 172 ;—Diplazium accedens, *Bl. En. p.* 192 ;—D. incisum, "*Schuhm R. Dansk. Vidensk. Afhandl.* iv. *p.* 232 ;"—Digrammaria robusta, *Fée. Gen. p.* 218. *t.* 18. *B.*

The specimen figured is from Assam.

Hab. Mauritius, Java, Isle of Leyte, Ternate, Moluccas, Borneo, Assam, Solomon's Group, S. Pacific, Feejee Islands, New Ireland, Tobie Island, W. Tropical Africa, Fernado Po.

PLATE No. LXX.

Callipteris prolifera
(Bory)

Govindoo del.

G. Winchester del & lith. Madras.

ASPLENIEÆ.

* * * * *Veins reticulated with marginal veinlets free.*

CETERACH. (Willdenow, Sp. Pl. v. 136.)

(Ceterach, *Adanson;* Notolepeum, *Newman;* Acrostichi Sp., *Cavanilles;* Asplenii Sp., *Auct.;* Grammitidis Sp., *Auct.;* Gymnopteridis Sp., *Bernhardi;* Scolopendrii Sp., *Symons;* Vittariæ Sp., *Bernhardi;* Gymnogrammatis Sp., *Sprengel* Sp.; Blechni Sp. *Auct.*)

Sori linear oblong, obsoletely indusiate; the receptacles lateral, usually anterior, *i. e.* in reference to the segment, (posterior in the basal sori), *Indusium* "linear narrow plane, sometimes obsolete," (*Hook.*) "thin narrow," (*Fée.*) *Veins* obscure, forked from a central costa, parallel and soriferous below, anastomosing irregularly near the margin, the basal anterior *venule* (*i. e.*, anterior in reference to the frond) soriferous on its anterior side.

Fronds pinnatifid coriaceous, densely clothed beneath with membranous imbricated scales. Rhizome short erect. This genus is anomalous. Its affinity is with the *Aspleniæ* on account of its lateral sori; but the sori in the common species seem to be without covers.—(*Moore*).

CETERACH OFFICINARUM. (Willd.) Caudex short thick densely rooting, fronds 6-10 inches long cæspitose lanceolate tapering below into a scaly slender stipes coriaceous opaque deeply pinnatifid subpinnate at the base green above and naked beneath densely clothed with imbricated tawny entire or toothed scales, segments broad-ovate or oblong horizontal obtuse lower ones or pinnæ much abbreviated, veins anastomosing copiously towards the margin, sori short oblong, involucre very narrow often obsolete. Asplenium Ceterach.—*Hook. Sp. Fil.* iii. 273.—*Linn. Sp. Pl. p.* 1,538;—Grammitis Ceterach, *Sw. Syn. Fil. p.* 23;—Ceterach officinarum, *Willd. Sp. Pl.* v. *p.* 136.—*Webb. Fl. Canar.* iii. *p.* 443.—*Hook. Gen. Fil. t.* 113 *A, and Brit. Flora, ed.* 7. *t.* 9. *f.* 1.—*Mett. Hort. Fil. Lips. p.* 80.—*Pappe and Raws Syn. Fil. Afr. Austr. p.* 23;—Scolopendrium Ceterach, *Sm. Engl. Bot. t.* 1,244-1. Gymnogramme Ceterach, *Spr.*

Hab. Throughout Europe, Asia, Siberia, Asia Minor, Northern Africa, North-West India, Persia, Thibet, Afghanistan, Kashmir, Azores, Canary Islands, Brazil.

PLATE No. LXXI.

Ceterach officinarum
(Willd)

Govindoo del.

G. Winchester del & lith Madras.

ASPLENIEÆ.

HEMIDICTYUM. *(Presl. Tent. Pterid.* 110*).*

(Asplenidictyon, *J. Smith* ; Asplenii Sp., *Auct.* ; Tarachia Sp., *Presl.* ; Diplazii Sp., *Hort.*)

Sori indusiate, linear elongate, parallel, oblique ; the *receptacles* lateral anterior. *Indusium* narrow, membranaceous, plane. *Veins* simple or forked from a central costa ; *venules* parallel at the base, reticulated towards the margin, forming trapezoid or elongated areoles, the apices arcuately combined, or connected by a continuous straight marginal *veinlet.*

Fronds coriaceous or thin herbaceous, pinnate, sometimes large. Rhizome thick erect.—(*Moore*).

HEMIDICTYUM FINDLAYSONIANUM. (Wall). Caudex erect stout woody scaly at the summit rooting below, stipites and rachis compressed deciduously scaly below, fronds 1-1½ foot long coriaceous (brownish-green when dry) oblong pinnate, pinnæ remote 5, 16 or 17, erecto-patent inequilaterally and subfalcately ovato-lanceolate long acuminate entire or sinuato-subangulate subauriculate unequally cuneate at the base and gradually attenuated into the petiole scarcely costate, terminal one subrhomboid unequally 3-lobed, veins subflabellate diverging from an indistinct costa dichotomous free below anastomosing towards the margin into very elongated subhexagonal areoles, terminal veinlets free or rarely combined in arches at the margin, sori linear elongated but varying much in length, originating at the centre but never extending to the margin, involucres narrow.—*Hook. Sp. Fil.* iii. 271.—*Wall. Cat. n.* 191.—*Hook. Ic. Plant. t.* 937 ; (*veinlets too copiously arched at the margin*) ;—A. integerrimum, *Wall. Ms.*—*Hook. et Grev. Ic. Fil. t.* 136 ; *inaccurate in the venation*) ;—Hemidictyum Finlaysonianum, *Moore Ind. Fil. p.* 1 ;—H. Hookerianum, *Moore Ind. Fil. p.* 130 ; *who quotes* A. Hookerianum, *Wall. Cat. n.* 2,682.)

The specimen figured is from the Khasya Hills, (Dr. Thomson).

Hab. Penang, Mishmee, Sikkim, Khasya, Assam, Nepaul, Kumaon.

PLATE No. LXXII.

Hemidyction Findlaysonianum
(Wall)

Govindoo del:

G. Winchester del & lith: Madras.

POLYPODIEÆ.

Margins of the fronds revolute, indusioid (i. e., the sori spuriously indusioid).

ALLOSORUS. *Bernhardi, Schrad neues Journ. Bot. 1. pt. 2. 5. 36. t. 2. f. 6.*

(Allosorus, *Auct.;* Phorolobus, *Desvaux;* Homopteris, *Ruprecht;* Pteridis Sp., *Auct.;* Cryptogrammatis Sp., *Auct.;* Struthiopteridis Sp., *Auct.;* Steganiæ Sp., *Auct.;* Onocleæ Sp., *Auct.;* Osmundæ Sp., *Auct.;* Blechneæ Sp., *Auct.;* Acrostichi Sp., *Auct.;* Chelanthis Sp., *Auct.;* Onychii Sp., *Fée*).

Sori spuriously-indusiate, rotundate, covered by the revolute subherbaceous margin of the pinnules, at length confluent into a transverse line (parallel to the margin) often becoming effuse; the *receptacles* punctiform. *Veins* in the fertile fronds simple or forked, from a central costa; in the more divided sterile fronds simple or forked in the ultimate segments; *venules* free.

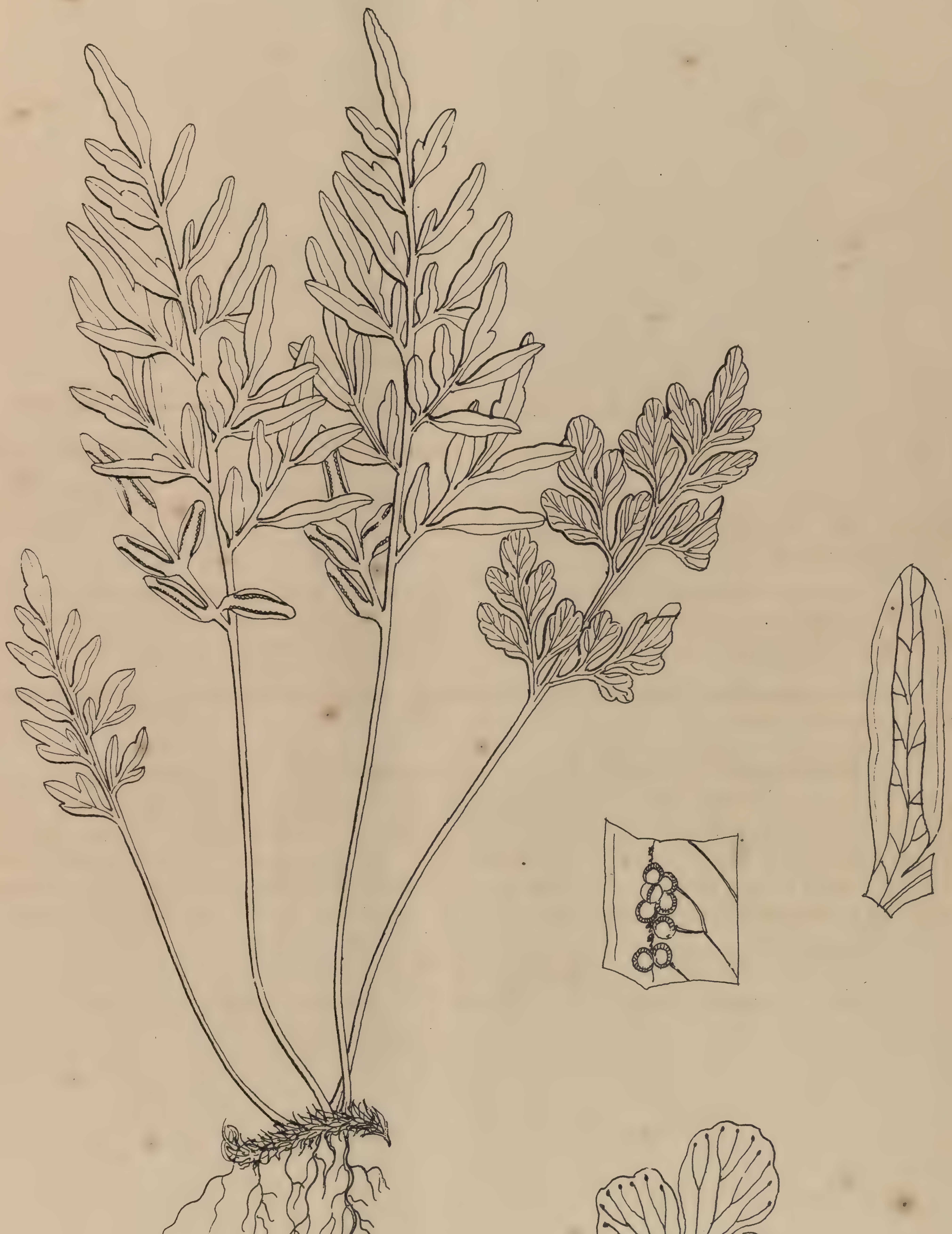
Fronds dimorphous, dwarf, herbaceous, bi-tripinnate; the fertile contracted, *i. e.*, with revolute siliculiform pinnules. Rhizome short decumbent.—(*Moore*).

ALLOSORUS STELLERI. (Rupr.) Caudex 4-6 inches high very slender filiform slightly scaly, fronds thin-membranaceous pale-green bipinnate, sterile pinnules obovate or subrhomboidal sinuato-lobate, fertile ones lanceolate obtuse crenate all more or less petiolate, terminal ones elongated, veins remote simple or forked, sori subrotund, involucres broad continuous very thin membranaceous whitish subconvex but close pressed, stipes very slender dark-brown glossy, superior rachises winged.—Pellæa gracilis, *Hook Sp. Fil.* ii. 138;—Allosorus gracilis, *Pr. Gray, Man of the Bot. of North U. St. p.* 264. *ed.* 2. *p.* 591. *t.* 9;—Pteris gracilis, *Mich., Fl.* ii. *p.* 262, (*not Fée.*);—Cheilanthes gracilis, *Kaulf. Enum. Fil. p.* 209;—Allosorus Stelleri, *Rupr. Dist. Crypt. Ross* 47.—*Ledeb, Fl. Ross.* iv. 526.

The figure is taken from Sir W. Hooker's "Species Filicum."

Hab. N. America, Canada, N. India, Kumaon (alt. 10,000 feet), Champwa, N. W. Thibet.

PLATE No. LXXIII.



Allosorus Stelleri
(Rupr.)

Govindoo del.

G. Winchester del & lith. Madras.

POLYPODIEÆ.

POLYPODIUM. (See "Ferns of Southern India," p. 55.)

POLYPODIUM DRYOPTERIS. (L.) Caudex long creeping branched more or less scaly, stipes a span to a foot or more long very slender stramineous scaly below, fronds thin-membranaceous 5-6 inches and more long pentangular-deltoid tripartito-bipinnate, primary divisions long-petioled (especially the terminal one) deltoid, secondary pinnæ mostly sessile 1½-2 inches long oblong or ovato-oblong rather obtuse deeply pinnatifid, sometimes again pinnate at their base, segments oval entire or the inferior ones pinnatifido-serrate, veins forked, sori dorsal on the upper veinlet nearer the margin than the costule.—*Hook. Sp. Fil.* iv. 250.—*Linn. Sp. Pl. p.* 1,555.—*Engl. Bot. t.* 616.—*Sw. Syn. Fil. p.* 42.—*Schk. Fil. t.* 25.—*Willd. Sp. Pl.* v. *p.* 209.—*Hook. et Arn. Br. Fl. ed.* 8. *p.* 580. —*Ledeb. Fl. Alt. a,* genninum ; *his β is* P. Robertianum).—*Hook. Brit. Ferns* 4 ;—Phegopteris, *Fée.*—*Metten. Phegopt. p.* 9 ;—Polypod. calcareum, *Ph. N. Am. Fil.* ii. *p.* 639.

Hab. Throughout Europe, N. India, Western Himalaya, Siberia, Japan, Greenland, Northern United States.

PLATE No. LXXIV.

Polypodium Dryopteris
(L)

G. Winchester del & lith: Madras.

POLYPODIEÆ.

PLEOPELTIS. (See "Ferns of Southern India," p. 57.)

PLEOPELTIS SUPERFICIALIS. (Bl.) Caudex very long creeping or scandent branched tortuose sparingly paleaceous with subscariose short lanceolate scales, stipites more or less distant 2-6 inches long often curved upwards, fronds 6-12 inches long 1-2 inches broad straight or subfalcate firm-membranaceous generally very opaque lanceolate or oblongo-lanceolate entire glabrous finely acuminated, below gradually attenuated and decurrent upon the stipes, no distinct costules, primary veins obliquely patent flexuose slender united by transverse veins so as to form about four rows of large subquadrate areoles, these are again divided into irregular lesser ones which include free simple or branched veinlets, sori small arranged in two irregular series between the primary veins.—*Hook. Sp. Fil.* v. 71.—*Bl. Fil. Jav. p.* 136. *t.* 56. *f.* 1 ;—P. hymenodes, *Wall. Cat. n.* 283 ; (*not of Kze. according to Metten. Fil. Hort. Lips. p.* 37. *t.* 25. *f.* 40-41. *Fée, Polyp. p.* 115).

The specimen figured is from the Khasya Hills, (Calcutta Herbarium.)

Hab. Java, Chappadong mountains, Tenasserim, Khasya, Bhotan (alt. 3,000-6,000 feet), Hongkong.

PLATE No. LXXV.

Govindoo del

G. Winchester del & lith. Madras.

POLYPODIEÆ.

POLYPODIUM. (See "Ferns of Southern India," p. 55.)

POLYPODIUM SUBFALCATUM. (Bl.) Caudex small, obliquely erect, crinite rather than paleaceous, stipites short, 3-8 lines long, patenti-pilose, fronds firm-membranaceous, hairy on both sides and on the costa, 6-8 inches long, 1-1½ inch broad, oblong-lanceolate subacuminate attenuated below deeply almost to the rachis pinnatifid, segments horizontally patent from a rather broad and decurrent base, linear-lanceolate acute, strongly serrated or pinnatifido-serrate, lower ones remote, distinct smaller than the rest, costule slender flexuose, veins evident, distant oblique soriferous at the apex, sori small globose one to each serrature equi-distant between the costule and the margin. *Hook. Sp. Fil.* iv. 193.—*Bl. Fil. Jav., p.* 186. *t.* 87. *A. B.* *J. Sm. in Hook. Journ. Bot.* 111. *p.* 394. *Metten. Polyp. p.* 52; —P. fili pendulifolium ;—*Fèe. en. Fil. p.* 240,—6 *me. Mèm. p.* 11. *t.* 5 *f.* 3, *var. J. β glabrum* ; fronds glabrous.

The specimen figured is from the Herbarium of the Calcutta Botanical Gardens.

Hab. Nepal, Kumaon (alt. 8,000 feet). Sikkim, Himalaya, Java, Luzon.

PLATE No. LXXVI.

Polypodium subfalcatum
var β. glabrum. (Bl.)

Govindoo del:

G. Winchester del & lith: Madras.

POLYPODIEÆ.

DICTYOPTERIS. (See page 4.)

DICTYOPTERIS IRREGULARIS. (Presl.) Caudex stout ascending, stipites tufted 4 inches to 1½ foot in length, black setaceo-paleaceous at the base, fronds subcoriaceo-membranaceous minutely pellucido-punctulate glabrous often subglaucous beneath, pinnate with very numerous pinnæ, from 6 inches to a foot long, 1-3 inches wide more or less, petiolate broad-oblong acuminated, the lowest pair half-ovate unequally bipartite, lowest segments deflexed and sometimes free, and 5-6 inches long, all of them more or less deeply lobed, often to within one-third of the costa, the lobes oblong, acute, or acuminate entire or sinuato-lobate, terminal pinna petiolate pinnatifid, costule one to each lobe, the veins anastomose, copiously forming elongated areoles, which are longest near the costæ and costules, areoles frequently including a free veinlet; sori dorsal or compital or even terminal on the free veins, copious, but rarely approaching the costa. *Hook. Sp. Fil.* v. 101. *Pr. Reliq. Hœnk.* i. *p.* 25. *t.* 4. *f.* 3. *Bl. Fil. Jav. p.* 164. *t.* 72;—Dictyopteris, *Pr. Tent. Pterid p.* 194. *t.* 8. *f.* 7. *Moore*;—Polyp. difforme, *Bl. Fil. Jav.* 135;—Aspidium. *Bl. En. Fil. Jav. p.* 160;—Dictyopteris, *Moore Ind. Fil. p.* 90;—Phegopteris, *Metten. Fil. Hort. Lips. p.* 84. *t.* 85. *f.* 29;—Pheg. macrodonta, *Metten. Phegopt, p.* 31;—Dictyopteris, *Pr. Tent. Pterid. p.* 194. *Fée Gen. Fil. p.* 267. *t.* 31. *A. f.* 2;—Polyp. confluens. *Wall. Cat. n.* 325;—Polyp. eximium, *Kze. in Bot. Zeit* iv. *p.* 424.

The specimen figured is from the Calcutta Herbarium and represents the upper portion of a large frond. Aspidium ? Pl. CXVIII of "the Ferns of Southern India" is undoubtedly this plant, and the name on the plate should be altered.

Hab. Moulmein, Anamally forests (Madras), Malay islands, Borneo, Luzon, Malacca, Fiji Islands.

PLATE No. LXXVII.

Dictyopteris irregularis
(Presl.)

Govindoo del.

G. Winchester del & lith Madras.

POLYPODIEÆ.

GONIOPHLEBIUM. (See page 5.)

GONIOPHLEBIUM. SUBAURICULATUM. (Bl.) Caudex creeping, stoloniferous densely clothed with narrow acuminato-setaceous scales subpruinate, stipites a span to a foot and more long, sparingly paleaceous, rufous-brown, fronds firm, subcoriaceo-membranaceous glabrous 2-6 feet long a foot and more wide pinnated, pinnæ horizontal, numerous yet remote; 3-4 to 8-10 inches long, ¼ to nearly ½ an inch wide; shortly petioled and jointed on the rachis from a somewhat cordate or truncated and occasionally auricled, base linear-lanceolate finely and gradually acuminated serrated, veins forming a double costular series of areoles, including a free venule, of which the lower series is soriferous, marginal veinlets free, sori in a single series nearer the costa than the margin forming, slightly elevated, pustules on the superior side. *Hook. Sp. Fil.* v. 32. *Bl. Fil. Jav. p.* 177. *t.* 83. *Metten. Fil. Hort. Lips. p.* 33;—P. Reinwardtii, *Kze. (fide Metten.)* Goniophlebium, *De Vriese*;—G. Pleopeltis, *Fée*—var. β. *Serratifolia;* pinnæ very coarsely serrated;—Goniophlebium serratifolium, *Brack. Fil. U. S. Expl. Exped. p.* 35;—Polyp. pallens, *Bl. Fil. Jav. t.* 84;—*f.* 1. *J. Sm. Metten. Polypod. p.* 81.

The specimen figured is from the Calcutta Herbarium (from Java.)

Hab. Khasya, Luzon, Java, Sumatra.—*Var β.* Fiji Islands, Luzon, Java.

PLATE No. LXXVIII.

PLATE LXXVIII.

Goniophlebium subauriculatum (Bl:)

Govindoo del:

G. Winchester del & lith.r Madras.

POLYPODIEÆ.

GONIOPHLEBIUM.

GONIOPHLEBIUM CUSPIDATUM. (Don. ?) " Caudex creeping, paleaceo-crinite," stipites 8-10 inches or more long, fuscous glossy, frond 2-3 feet long, 1 foot wide, oblongo-ovate, glabrous firm-membranaceous pinnate, pinnæ shortly petiolate and articulated upon the rachis, very patent opposite or alternate 6-8 inches long, $\frac{1}{2}$ $\frac{3}{4}$ inch wide from a gradually attenuated narrow-cuneate base, elongato-lanceolate finely and long-acuminate serrated entire at the base and at the point, veins forming two or three series of areoles, including a free veinlet, the costal series only soriferous, sori much nearer the costa than the margin, more or less sunk and forming more or less distinct pustules on the back. *Hook. Sp. Fil.* v. 32. *Don. Fil, Nep. p.* 6. ? *Bl. Fil. Jav. p.* 175. *f.* 82. *Metten. Polyp. p.* 81 ;—Goniophlebium, *Pr.*

The specimen figured is from the Calcutta Herbarium (from Java.)

Hab. Nepal, Java.

PLATE No. LXXIX.

PLATE LXXIX.

Goniophlebium cuspidatum

(Don:)

Govindoo del.

G. Winchester del & lith: Madras.

POLYPODIEÆ.

* * *Veins reticulated with free included veinlets.*

Free veinlets divaricate.

DIPTERIS, Reinwardt. Regensb. Bot. Zeit. 11-3.

(Polypodii. Sp. *Auct.*; Drynariæ, Sp., *J. Sm.*)

Sori non-indusiate, small, round, superficial; the *receptacles* punctiform. (1) Transversely sub-serial between the branches of a dichotomous costa, when the segments are confluent; or (2) longitudinally uniserial on each side, a central costa in the ultimate segments, when more distinct. Venation diverse: (1) in the more confluent species, the costa dichotomo-flabelliform with the *veins* prominent, transversely anastomosing, the *venules* and *veinlets* (several series) thickly anastomosing, the ultimate or penultimate soriferous, the ultimate branches often free dilated at the apex; or (2) in the more distinctly divided species, *costa* central, the *veins* and *venules* irregularly anastomosing with divaricate free sterile *veinlets*.

Fronds binate, digitato-palmately-lobed, or repitito-dichotomously partite, elongately stipitate, coriaceous. Rhizome woody creeping, the fronds adherent, or not readily separable. So remarkable and peculiar in habit, that, relying partly on the oligocarpous sori, we have kept it distinct from our *Pleopeltis* with which, in company with *Drynaria*, it is techincally allied. (*Moore.*)

DIPTERIS WALLICHII. (Br.) Caudex creeping, clothed with appressed copious black hard subulato-setaceous scales wrinkled at the back, stipites 1-2 and more feet long smooth and polished, fronds coriaceous 1-2½ feet long and much wider than long dark-green above, pale-yellowish ferruginous beneath, flabelliform bipartite into two nearly equal broad-cuneate portions which are palmately and dichotomously divided, ultimate segments 6-8-10 inches long, 1½-2 inches wide oblong acuminate, costæ from the summit of the stipes dichotomously branched through the disk of the frond, a single pair runs through each terminal segment connivent at the apices, venation manifest prominent beneath, all the costæ are united by transverse flexuose costules, these by a longitudinal flexuose vein through the middle into two nearly equal series of costular areoles, then again into lesser ones all sub-quadrangular, sori small, superficial copious scattered in the areoles, but generally in series more or less perfect and accompanied by a resinous or gummy substance. *Hook. Sp. Fil. v.* 99. *Br. in Hook. and Grev. Ic. Fil. t.* 168-9. *Wall. Cat. n.* 287. *Metten. Polypod. p.* 119;—Drynaria, *J. Sm.*;—Dipteris, *Moore Ind. Fil. p.* 341;—Polyp: macrocherios, *Wall. Herb.*

The specimen figured is from the Khasya Hills—(Dr. Thomson.)

Hab. Khasya, Bhotan, Assam, Pundoa Mountains.

PLATE No. LXXX.

Dipteris Wallichii (Br.)

Govindoo del:

G. Winchester del & lith. Madras.

POLYPODIEÆ.

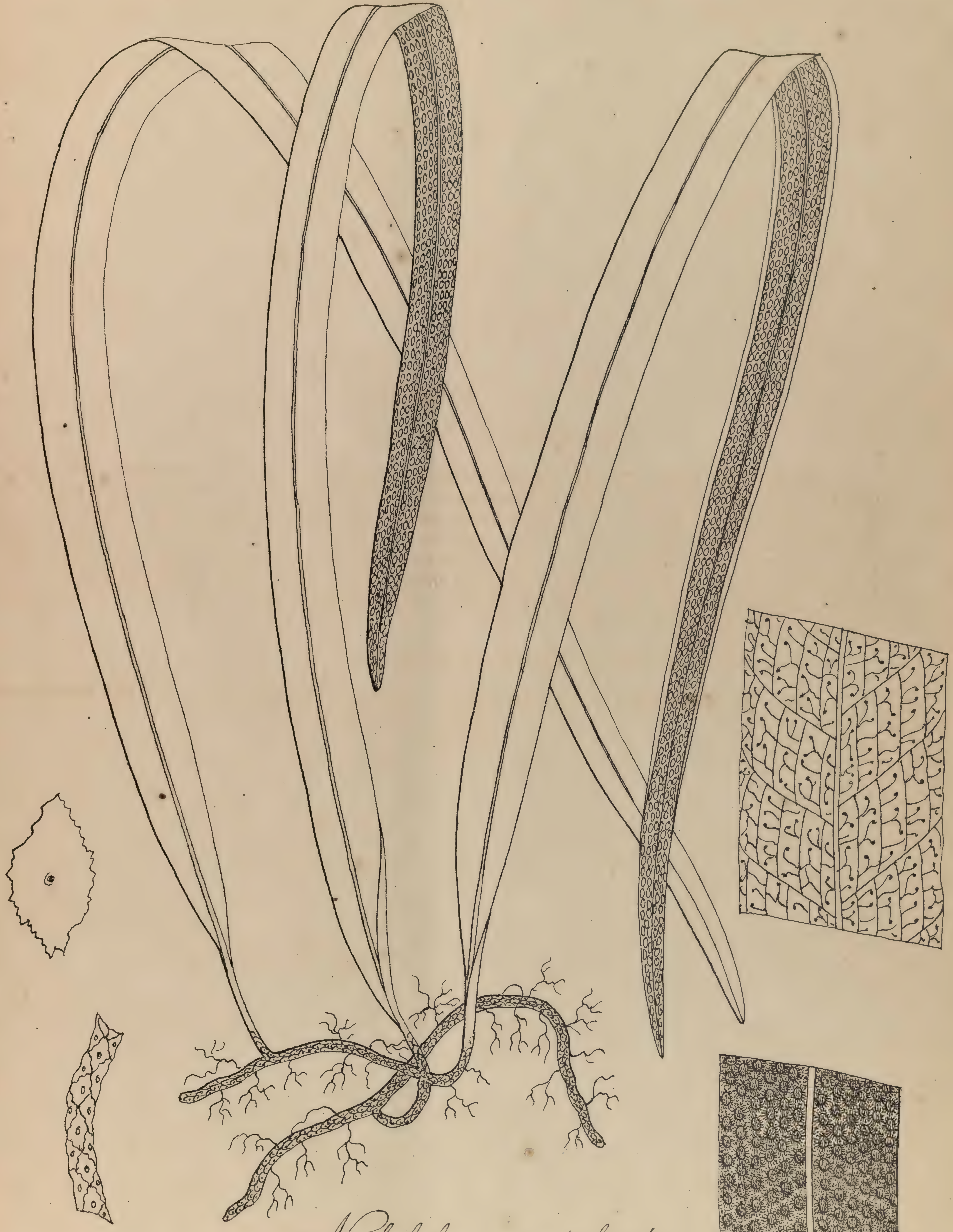
NIPHOBOLUS. (See "Ferns of Southern India," p. 61.)

NIPHOBOLUS ACROSTICHOIDES. (Sw.) Caudex creeping, branched younger portions squarrose with rather large bright ferruginous lanceolato-subulate scales, stipites 1-3 inches long, frond hard-coriaceous 1-3 feet and more long, ½-1 inch wide glabrous above, beneath whitish or tawny, stellato-tomentose (tomentum very deciduous) elongato-lanceolate or linear obtuse ; *Sterile* fronds generally the broadest, "areoles with 3-6 veinlets free and simple, or variously forked, and anastomosing ;" sori rather small, prominent very compact generally occupying the upper part of the frond arranged in 6-8 oblique, very close series between the costules. *Hook. Sp. Fil.* v. 44. *Sw. Syn. Fil. p.* 29. and 225. *An. Forst. Prodr.* 434. ? *Metten. Polyp. p.* 128. *Br. Prodr. p.* 146 ;—Cyclophorus, *Pr.* Niphobolus puberulus, *Bl. Fil. Jav. p.* 56. *t.* 23 ;—Cyclophorus glaber, *Desv.* (*not* P. Samarense, *Metten. Polyp. p.* 123.) ;—Gyrosorium, *Pr.* Polyp-furfuraceum ; *Wall. Cat. n.* 278.

The specimen figured is from the Calcutta Herbarium (from Java.)

Hab. Moulmein, Ceylon, Java, Isle Samar, Molucca Islands, and New Hebrides—N.E. Coast of New Holland, Penang.

PLATE No. LXXXI.



Niphobolus acrostichoides
(Sw.)

Govindoo del.

G. Winchester del & lith. Madras.

DICKSONIEÆ.

B. *Indusium distinctly two-valved.*

DICKSONIA. L' Heritier Sertum Anglicum, 30.

(Balantium, *Kaulfuss. Presl.* ;—Culcita, *Presl.* ; Leptopleuria, *Presl.* ; Cystodium, *J. Smith* ; Davalliæ Sp., *Auct.* ; Cibotii Sp., *Auct.* ; Microlepiæ Sp., *Auct.* ; Pataniæ Sp., *Auct.* ; Nephrolepidis Sp., *Mettenius.*)

Sori involucrately-indusiate, globose or short transverse oblong, marginal, more or less reflexed; the *receptacles* globose or transverse oblong, terminal. *Indusium* coriaceous, double, *i. e.* two-valved; the outer or accessory valve formed of a more or less attenuated lobule of the frond, cucullate, sometimes equalling in size, but more frequently larger than the inner valve or proper indusium, which latter, when smaller, is less convex than the outer. *Veins* simple forked or pinnate, from a central costa, *venules* free.

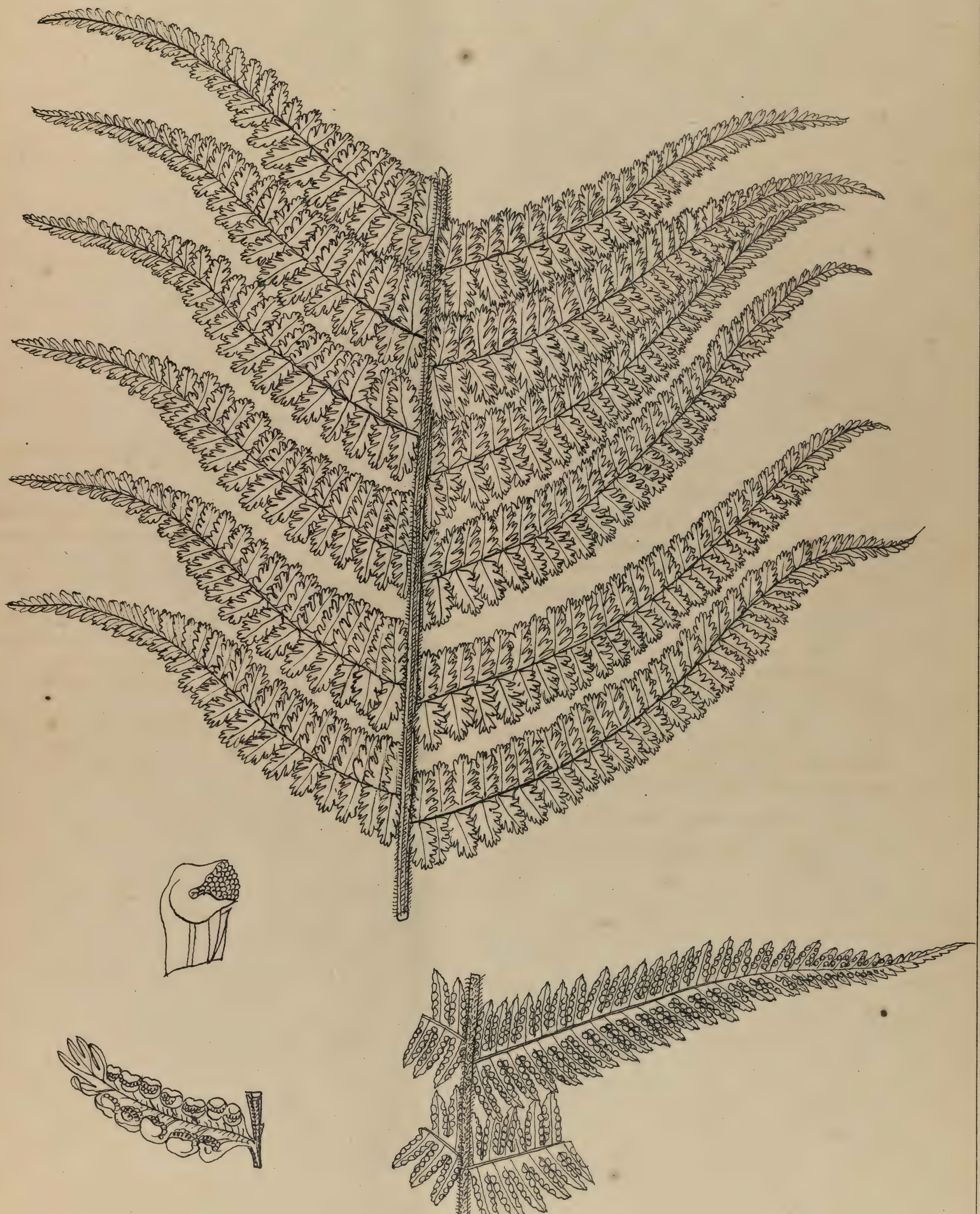
Fronds coriaceous, usually large decompound, sometimes pinnate, the fertile portions appearing somewhat contracted. Rhizome thick, short, erect or arborescent; sometimes decumbent, criniferous. Agenus of noble ferus, including several arborescent species. It is distinguished from *Dennstœdtia* by the two-valved, not entire cup-shaped, indusium ; and from *Cibotium* by the more or less herbaceous texture of the outer valve of the Indusium, which in *Dicksonia,* is but a partially changed lobule of the frond. (Moore.)

DICKSONIA APPENDICULATA. (Wall.) Every where especially beneath piloso-glandular, fronds lanceolate tall, much attenuated at the base bipinnate, pinnæ narrow, oblong almost linear pinnatifid, the segments oblong entire or bi-trifid, the base decurrent on the rachis, sori large, globose copious upon the shortened teeth of the segments. *Hook. Sp. Fil.* i. 79. *Wall. Cat. n.* 65.

The figure is taken from Sir W. Hooker's Sp. Fil.

Hab. Nepal, Kumaon.

PLATE No. LXXXII.



Dicksonia appendiculata
(Wall.)

Govindoo del. G. Winchester del & lith: Madras.

DICKSONIEÆ.

* * *Indusium distinctly two-valved.*

CIBOTIUM. Kaulfuss, Berl. Jahrb. der Ph. (1820) Id. Enum. Fil. 229. *t.* 1.

(Pinonia, *Gaudichaud* ;—Hiatea, *Menzies M. S.*, (Hook. Sp. Fil.)—Dicksonia, Sp. *Auct.* ;—Balantii, Sp. *Auct.* ;—Aspidii, Sp. *Auct.* ;—Polypodii, Sp. *Auct.*)

Sori involucrately-indusiate, sub-globose, marginal, reflexed ; the *receptacles* slightly elevated, terminal. *Indusium* two-valved, coriaceous, distinct from the substance of the frond ; the outer valve larger cucullate, the inner operculiform. *Veins* forked or pinnate from a central costa ; *venules* free.

Fronds large, decompound ; Rhizome thick, short decumbent, or erect. This genus, like Dicksonia, has two-valved indusia ; the texture of the two valves is alike and evidently different from that of the frond, on the extreme margin of which they are borne. (Moore.)

CIBOTIUM GLAUCUM. (Hook. and Arnt.) Fronds bipinnate, glabrous and shining on the upper side, glaucous beneath, with occasionally a few hairs on the rachis, pinnules deeply pinnatifid, lanceolate, acuminate 4-5 in. long, the upper ones diminishing and tapering into a pinnatifid apex, lobes or segments numerous, more or less falcate, veins simple or forked, indusia very prominent and coriaceous, usually 2 to 4 on each margin of each lobe or sometimes only 1 on each side at the base, valves concave, very nearly equal or the inner one rather narrower. *Benth. Fl. Hongkong, p.* 460. *Hook. Sp. Fil.* i. 82 ;—C. glaucescens *Kunze. Hook. Sp. Fil.* i. 82 ;—C. Assamicum. *Hook. l. c.* i. 83. *t.* 29. *β.*

The specimen figured is from Assam.

Hab. Assam, Hongkong, S. China, Sandwich Islands.

PLATE No. LXXXIII.

Cibotium glaucum

(Hook & Arn^t.)

Govindoo del.

G. Winchester del & lith. Madras.

ALSOPHILEÆ.

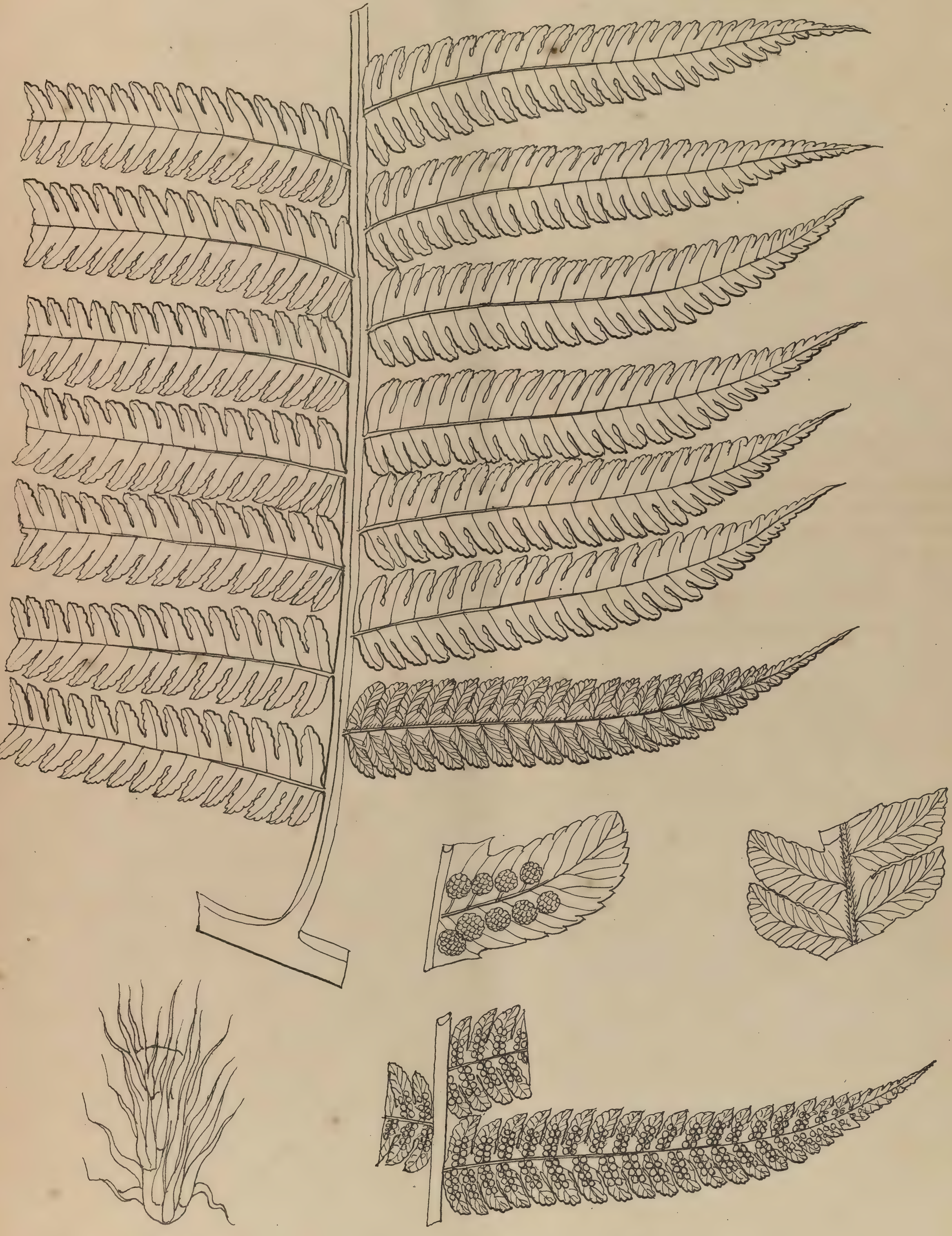
ALSOPHILA. (See "Ferns of Southern India," p. 19.)

Alsophila comosa. (Wall.) Unarmed, stipes densely clothed with long chaffy pale brown deciduous scales, rachis strigose or almost setose above, fronds bipinnate, pinnæ united towards the apex, so as to be the there pinnatifid, pinnules sessile or nearly so oblong-lanceolate moderately acuminated submembranaceous pinnatifid about two-thirds of the way down, segments ovate slightly falcate obtuse, veins generally forked, bullate scales none, receptacles small slightly elevated. *Hook. Sp. Fil.* i. 53 ;—A. Comosa, *Wall. Cat. n.* 319.

The figure is taken from Sir W. Hooker's "Species Filicum."

Hab. Khasya Hills, Sincapore, Java.

PLATE No. LXXXIV.



Alsophila comosa
(Wall.)

Govindoo del.

G. Winchester del. & lith. Madras.

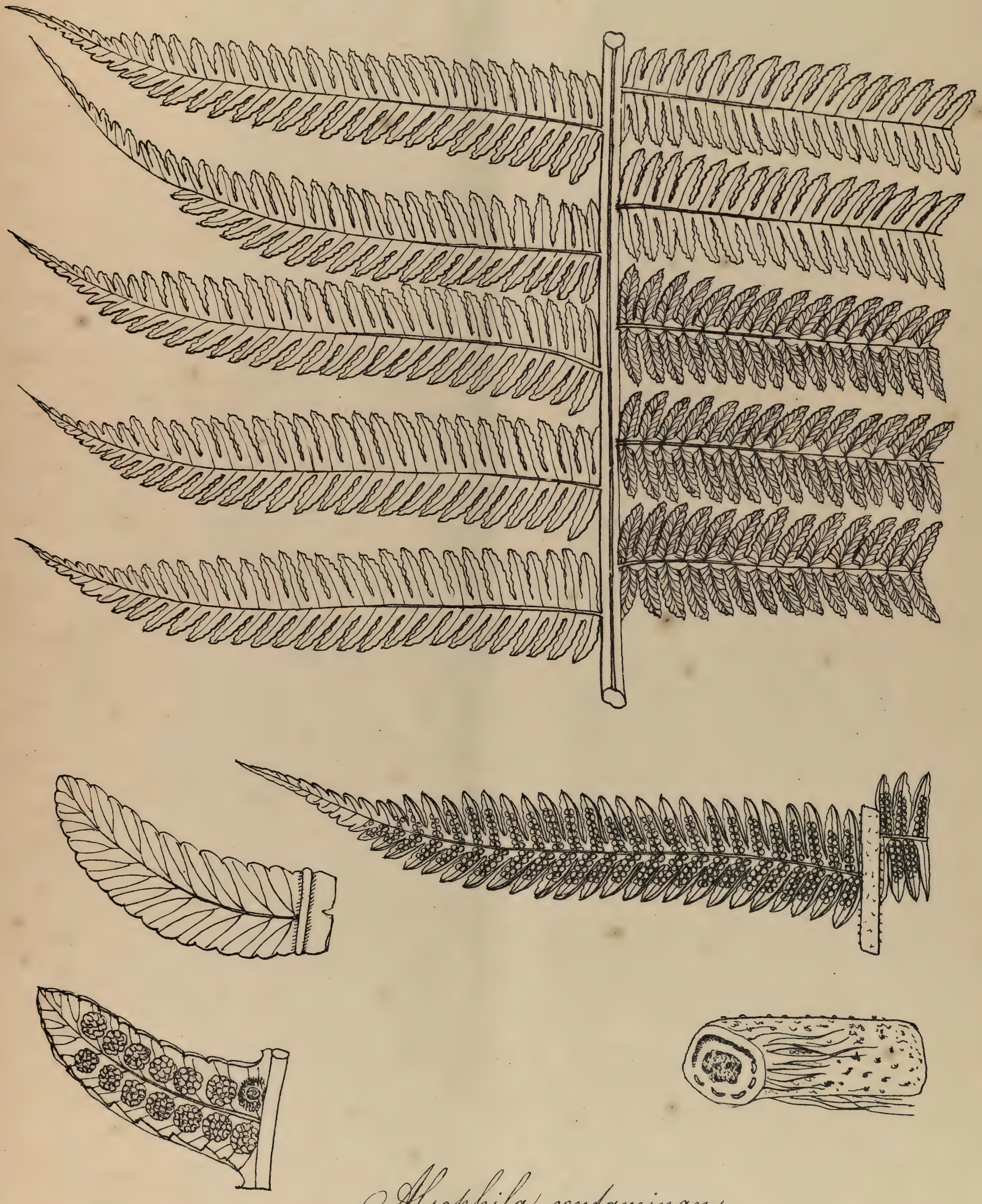
ALSOPHILA.

ALSOPHILA CONTAMINANS. (Wall.) Aculeolate, frond bipinnate coriaceous glaucous beneath, pinnules oblong-lanceolate acuminate deeply pinnatifid, segments oblong falcate, the fertile ones narrower, rather obtuse crenulate, sori upon forked veins in lines parallel with the costa and covering nearly the whole segment, capsules mixed with hairs. *Hook. Sp. Fil.* i. 52 ;—A. Contaminans, *Wall. Cat. in Index* ;—Polypodium contaminans, *Wall. in Herb.* 1823. *Cat. n.* 320 ;—Chnoophora glauca, *Blume. En. Fil. Jav. p.* 243 ;—Alsophila glauca, *J. Sm.*

The figure is taken from Sir W. Hooker's "Species Filicum."

Hab. Sylhet, Penang, Java, Molucca, Luzon, South Camarines, Phillipines, New Guinea, Birmah.

PLATE No. LXXXV.



Alsophila contaminans
(Wall.)

Govindoo del. G. Winchester del. & lith. Madras.

ALSOPHILA.

ALSOPHILA BRUNONIANA. (Wall.) Unarmed, fronds bipinnate pinnules lanceolate acuminate deeply pinnatifid coriaceous glaucous beneath, veins once or twice forked, bullate scales none, margin re-curved entire or crenulate, sori in two rows occupying the greater part of the segments. *Hook. Sp. Fil.* i. 52. *Wall. Cat. n.* 7073.

The specimen figured is from the Khasya Hills—(Dr. Thomson.)

Hab. Khasya Hills, Sylhet, Mishmee, Naga Hills, Cachar.

PLATE No. LXXXVI.

Alsophila Brunoniana (Wall.)

Govindoo del: G. Winchester del & lith. Madras.

CYATHEA.

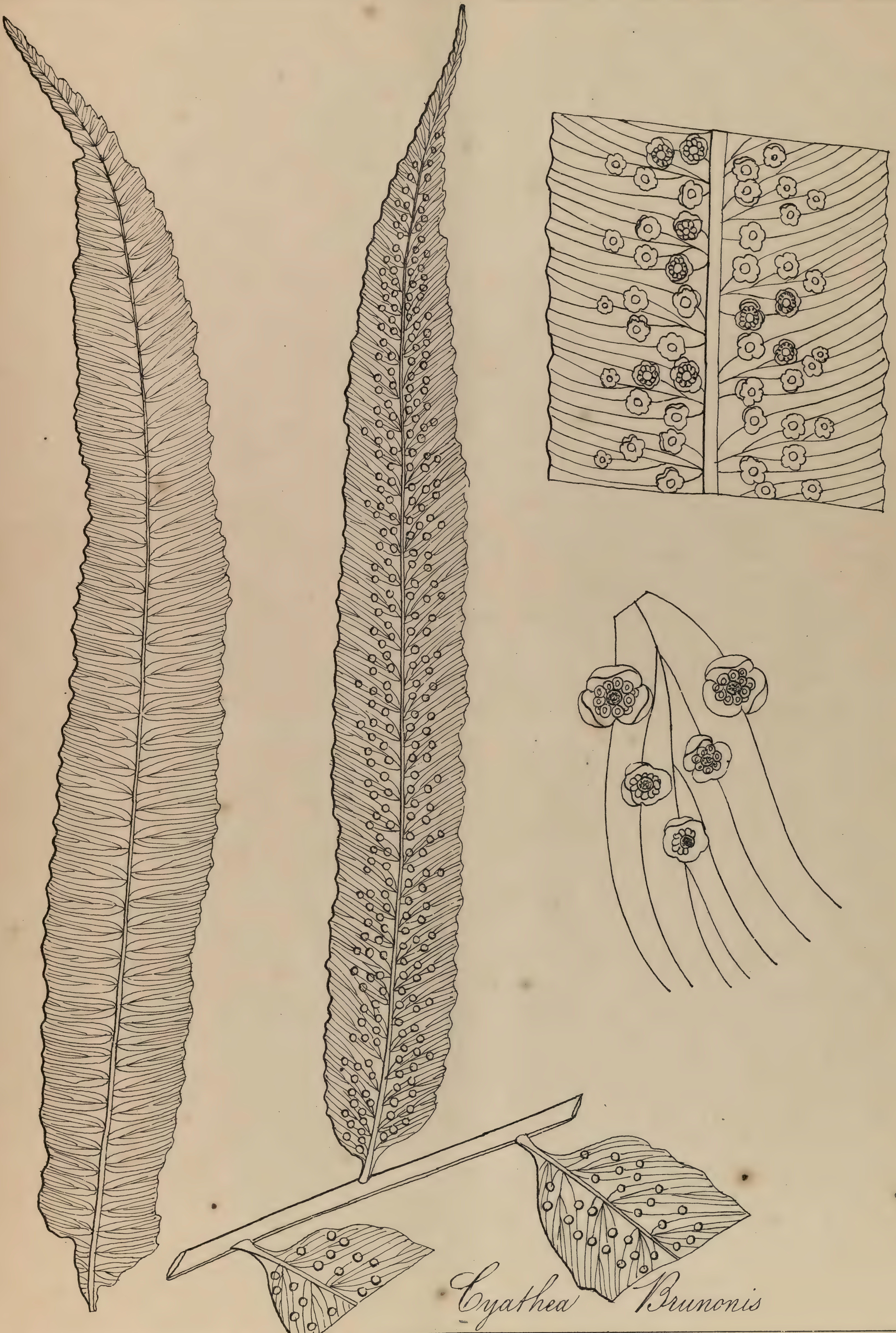
CYATHEA. (See "Ferns of Southern India," p. 19.)

CYATHEA BRUNONIS. (Wall.) Stipes 1 to 2 feet long, fronds 2-3 feet, pinnated-pinnæ 6-8 inches long alternate, between membranous and coriaceous, oblongo-lanceolate acuminated with a long narrow point, obliquely truncated at the base and shortly petiolate, sinuato-crenate often serrated at the margin above. Sori copious from the middle of the forked veins or veinlets. Involucre globose or slightly depressed, bursting very irregularly at the top so as to become cup-shaped with a lacerated and lobed margin. Capsules stalked. *Hook. Sp. Fil.* i. 15, *Wall. Cat. n.* 179 ;—C. Loingifolia etensiformis. *Wall. in Herb.* 1823 ;—Cyathea Moluccana, *R. Br. Desv. Prod.* 322 ;—Cyathea pinnata, *Roxb. Cal. Journ. Nat. Hist.* iv. 517 ;—Schizocana Brunonis ;—*Hook. Gen. Fil. t.* 2 ;—Schizocana Gaudichandii. *Fée. Gen. Fil.* 354.

The specimen figured is from Penang. — C. Parish. —

Hab. Penang, Malacca, Molucca Islands, Borneo.

PLATE No. LXXXVII.



Cyathea Brunonis

Govindoo del:

G. Winchester del & lith. Madras.

WOOWARDIEÆ.

WOODWARDIA. (Sm. Mem. Acad, Turin. v. 411. *t.* 9.)

(Lorinseria, *Presl.* ;—Anchistea, *Presl.* ;—Blechni, Sp. *Auct.*)

Sori in a single series, oblong or oblong-linear sunk in a cavity of the frond, parallel with and near the costa or costules. *Receptacles* on the transverse anastomosing veins which form a series of arches next the costa and from which veins originate and are more or less anastomosing sometimes very much so even to the margin. Involucres almost coriaceous usually persistent and opening with a lid above the cavity.

Caudex or rhizome very long and thick decumbent scaly copiously rooting. Stipites very paleaceous at the base with long subulate scales. Fronds pinnated or bipinnate. (Hooker.)

WOODWARDIA RADICANS. (Smith). Stipes elongate with large lanceolate acuminate paleaceous scales at the base, fronds ample pinnate subcoriaceous, pinnæ distant often a foot or more long petiolate deeply pinnatifid broad-lanceolate acuminate, laciniæ ovato-lanceolate acuminate subfalcate spinuloso-serrate towards the apex, veins reticulate towards the main costa (of the pinnæ), a single series of areoles outside of the sori thence free to the margin, sori parallel with and near to the costule short oblong sunk in the cavity of the sorus which has an elevated margin, involucre vaulted coriaceous, rachis here and there producing large scaly germinating gemmæ at the base of some of the pinnæ. *Hook. Sp. Fil.* iii. 66. *Smith, Act., Taur.* v. *p.* 4-12—*Schk. Fil. p.* 104. *t.* 112—(*venation very bad*), *Sw. Syn. Fil. p.* 117. *Hook. Gen. Fil. t.* 17 ;—Blechnum radicans, *Linn. Mant. p.* 307 ;—Woodwardia stans, *Sw. Syn. Fil. p.* 117. *Schk. p.* 104. *t.* 113 ;—W. auriculata, *Bl. En. Fil. Jav. p.* 196.

The specimen figured is from Dalhousie—(Col. Dyas.)

Hab, Himalaya mountains, (alt. 4-5,000 feet), Java, Madeira, Canary Islands, Spain, Portugal, Italy Sicily.

PLATE No. LXXXVIII.

Woodwardia radicans
(Sm:)

Covindoo del:

G. Winchester del & lith: Madras.

PTERIDEÆ.

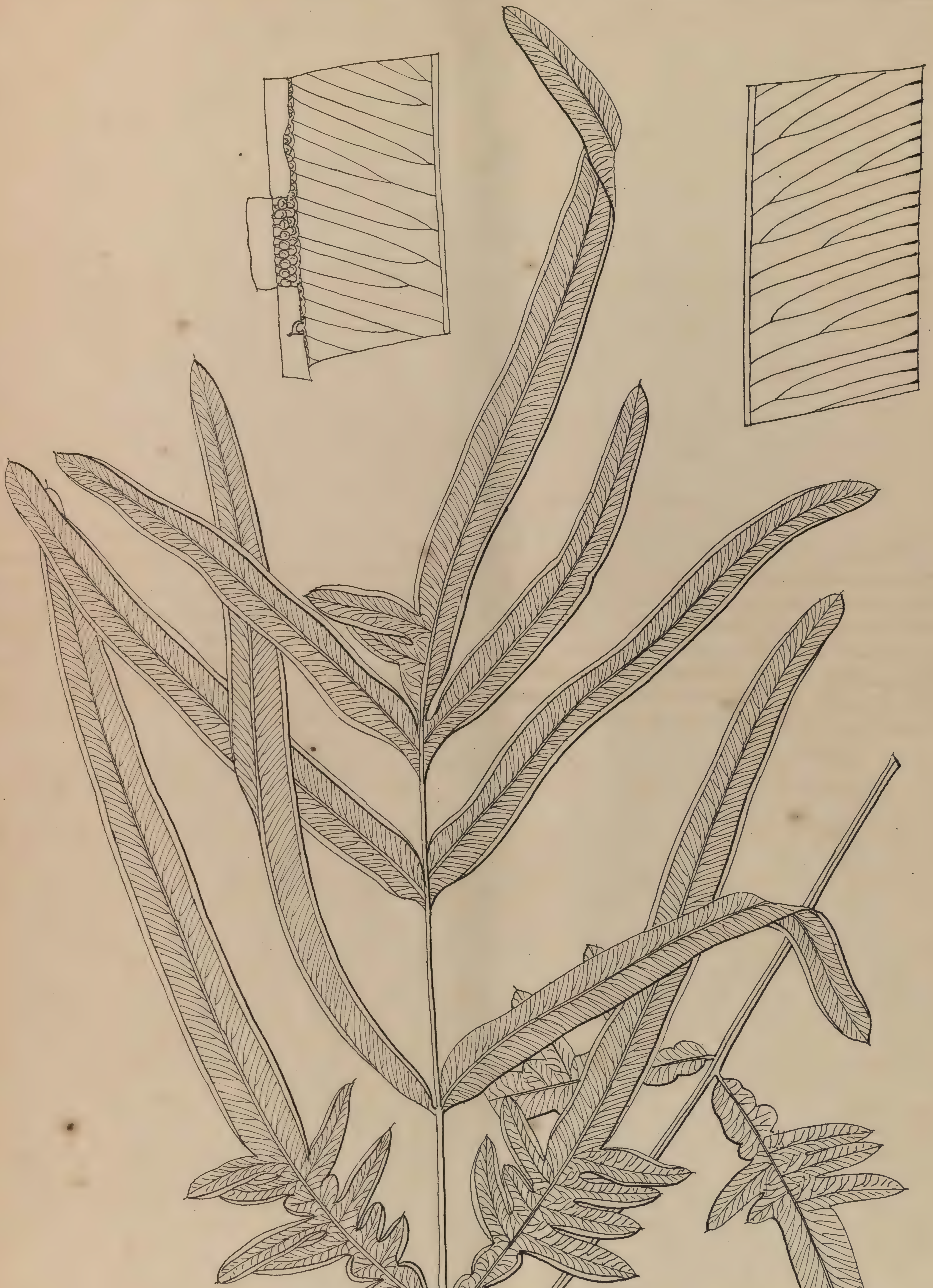
PTERIS. (See "Ferns of Southern India," p. 11.)

PTERIS HETEROMORPHA. (Fee.) 1½-2 feet high erect firm, caudex scarcely any, roots wiry, cæspitose, frond 1-1½ foot high broad lanceolate subcoriaceo-membranaceous remotely pinnate, pinnæ usually opposite, 4-6 pairs sessile linear-lanceolate elongated acuminated, 3 to 5 or 6 inches long entire at the margin or subsinuato-crenate serrated only at the apex simple (undivided) or here and there with only a single or two horizontal lobes or ears near the base (rarely above the base), at other times the upper pinnæ are sparsely lobed and the lower ones gradually more so, the lowest ones pinnatifid in their lower half with 4-6 oblong-lanceolate lobes on each side spreading horizontally (almost pectinated,) veins approximate simple or once forked, veinlets reaching to the margin, sori continuous but not extending to the apex, involucres marginal membranceous narrow, stipites short in proportion to the length of the fronds and rachises slightly rough to the touch bright tawny glossy. *Hook. Sp. Fil.* ii. 166 ;—Pt. heteromorpha, *Fée, Gen. Fil. p.* 125-127 ;—Pt. propinqua, *J. Sm. En. Fil. Philipp. in Hook. Journ. of Bot.* iii. *p.* 405—*(not of Agardh and name only.)*

The specimen figured is from Birmah. *Parish.*

Hab. Birmah, Luzon.

PLATE LXXXIX.



Pteris heteromorpha
(Fée)

Govindoo del.
G. Winchester del & lith. Madras.

PLATYLOMEÆ.

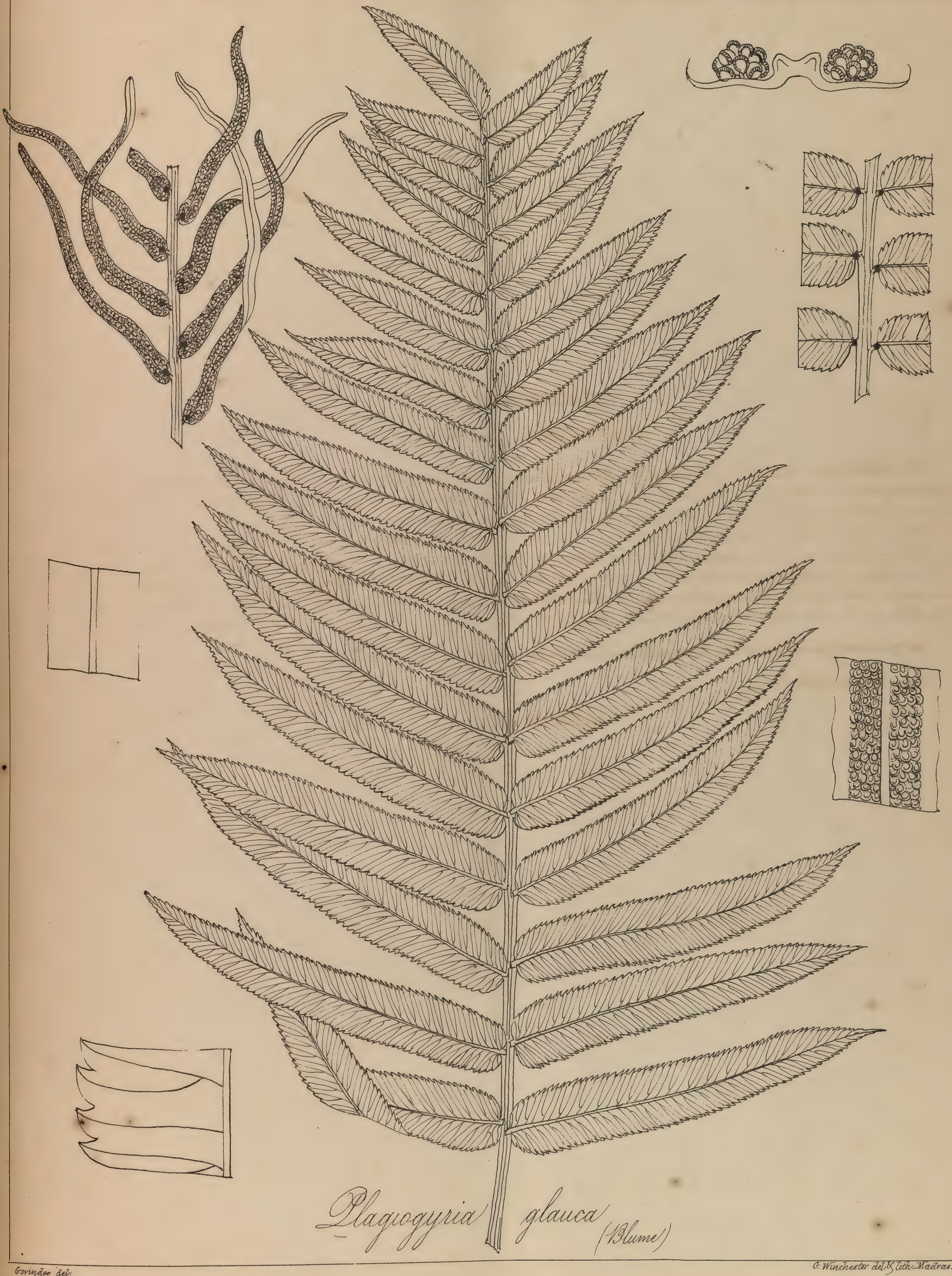
PLAGIOGYRIA. (See page 51.)

PLAGIOGYRIA GLAUCA. (*Bl.*) Caudex ? stipites elongated, subcompressed tetragonous with two furrows in front, the base dilated triquetrous on the anterior face bearing spongy depressed glands, fronds ovato-oblong 1-2 feet long pinnated, *sterile* pinnæ numerous, 3-5 inches long, chartaceous horizontally spreading sessile or very nearly so lanceolate, acuminated at the base, truncated beneath having a gland as much attached to the rachis as to the very short petiole, the margins finely dentato-serrulate, rather more strongly at the apex, white and almost powdery beneath, green above with a tinge of red, veins copious, compact simple and forked, ultimate short pinnæ confluent into a pinnatifid and lobed caudate apex, *fertile* pinnæ narrow-linear obtuse erecto-patent on very short petioles which sometimes bear a gland beneath, sori and involucres as in other *Plagiogyriæ*. Lomaria *(Plagiogyria) glauca. Hook. Sp. Fil.* iii. 22. *Bl. En. Fil. p.* 204. *Kze. in Bot. Zeit.* viii. *p.* 143 *; in Schkh. Fil. Suppl.* ii. 24. *t.* 138.—Plagiogyria glauca, *Metten. Plagiog. p.* 9.

The specimen figured is from the Khasya Hills—(Calcutta Herbarium).

Hab. Khasya Hills, Java.

PLATE No. XC.



Plagiogyria glauca (Blume)

Govindoo del.

G. Winchester del & lith. Madras.

CYSTOPTERIDEÆ.

CYSTOPTERIS. Beruhardi. Schrad. Neues. Journ. Bot. i., Part 11., 5. 26. *t.* 2. *f.* 9.

(Cystea, *Smith* ;—Cyclopteris, *Gray* ;—Aspidii, Sp., *Auct.* ;—Polypodii Sp., *Auct.* ;—Cyathea Sp., *Auct.* ;—Nephrodii Sp., *Auct.* Athyrii Sp., *Auct.*)

Sori indusiate ; the *receptacles* medial. *Indusium* roundish-ovate, fornicate or sub-hemispherical, affixed by its broad base, the apex often lacerate, sometimes acuminate. *Veins,* simple forked or pinnate from a central costa ; *venules* free.

Fronds membranaceo-herbaceous, bi-tri-pinnate. Rhizome tufted, decumbent, or elongated and creeping. (Moore.)

CYSTOPTERIS FRAGILIS. (Bernh.) Fronds broad lanceolate bipinnate, pinnæ ovate or lanceolate variously toothed or acuminated or pinnatifid, the segments more or less acute entire or again toothed. Sori scattered more or less distant, sometimes crowded and almost confluent, rachis winged. *Hook. Sp. Fil.* i. 197. *Bernh. Neu Journ. Bot.* i. *p.* 27 ;—Polypodium, *L.* ;—Aspidium, *Willd. Sp., Pl.* v. *p.* 280 ;—Cyathea Orientalis, *Desv.*

The specimen figured is from Nepal.

Hab. Himalayas, Simla, Nepal, Punjab, Great Britain, and throughout Europe, Siberia, Asia Minor, Persia, North and South America, Madeira, West Indies, North and South Africa.

PLATE No. XCI.

Cystopteris fragilis
(Bernh.)

Govindoo del.

G. Winchester del & lith. Madras.

ACROPHORUS. (See " Ferns of Southern India," p. 3.)

ACROPHORUS PSEUDO-CYSTOPTERIS. (Kze.) Caudex creeping covered with peltate imbricated jagged scales, fronds ovate membranaceous supra decompound, primary pinnæ petiolate ovate lanceolate, secondary petiolate ovate oblong, pinnules deeply pinnatifid, the segments, very narrow linear acuminate, entire or bifid sori medial on the segments, indusium small sub-reniform, veins terminating within the margin.

This species somewhat resembles *A. affinis,* but the pinnules are more finely cut and the caudex is quite different.

The specimen figured is from Dalhousie—(Colonel Dyas).

Hab. Himalayas.

PLATE No. XCII.

Acrophorus pseudo-cystopteris (Kze)

Govindoo del.

G. Winchester del & lith. Madras.

ACROPHORUS.

Acrophorus nodosus. (Presl.) Frond tripinnate, membranaceous furfuraceous on both sides of the veins, pinnules sessile (chaffy beneath at their insertions) oblong-lanceolate, secondary ones sessile oblong obtuse, pinnatifid, segments cuneiform obtuse, lowest ones inciso-serrate or at the base again sub-auriculate, sori solitary sub-marginal, rachis nodose above at the insertion of the pinnæ and ferrugineo-tomentose, stipes slightly rough or glabrous paleaceous below. *Hook. Sp. Fil.* i. 157 ;—Aspidium nodosum, *Bl. En. Fil. Jav. p.* 171. ;—Acrophorus nodosus, *Pr.* Aspidium ? foliolosum, *Wall. Cat.* 359 ;—Davallia stipellata, *Wall. Cat.* 260 ? Monochosorum, davallioides, *Kze. Bot. Zeit.* vi. 119—? Anogramma davallioides, *Fee. Gen. Fil.* 184.

The specimen figured is from the Khasya Hills—(Dr. Thomson).

Hab. Khasya, Assam, Sikkim, Bhotan, Java, Moluccas.

PLATE No. XCIII.

Acrophorus nodosus.
(Presl.)

Govindoo del: G. Winchester del & lith: Madras.

ACROPHORUS.

ACROPHORUS ASSAMICUS. (Bedd.) Caudex creeping covered with numerous imbricated chaffy golden scales, fronds glabrous shining, 8-14 inches long, (including the stipes which is 2 to 3 inches) 2 to 3 inches broad, coriaceous membranaceous lanceolate pinnate with the primary pinnæ alternate or opposite pinnatifid almost to the rachis, lower ones petiolate upper ones decurrent so as to form a regular wing to the rachis, pinnules pinnatifid, segments toothed, each bearing one sorus, veins terminating within the margin involucres as in the genus.

The specimens figured are from Assam—(Dr. Thomson) and are marked by Mr. Moore—"*New species near membranulosus.*"

Hab. Assam.

PLATE No. XCIV.

Acrophorus Assamicus
(Bedd:)

Govindoo del:

G. Winchester del & lith. Madras.

ACROPHORUS.

ACROPHORUS HOOKERI. (Moore). Fronds ovate or oblongo-ovate glabrous membranaceous 6-10 inches long by 4-5 inches broad tripinnate secondary and tertiary rachides much flattened, being composed, as it were, of the decurrent base of the pinnæ or pinnules, pinnules linear obtuse entire or bifid, veins simple or forked and terminating considerably within the margin, sori, one to each pinnule situated at the forking of the vein, indusium as in the genus.

A delicate finely cut species with much the appearance of Asplen : tenuifolium easier understood from the figure than by any description.

The specimen figured is from the Khasya Hills, (Dr. Thomson).

Hab. Khasya, Sermur, Sikkim.

PLATE No. XCV.

Acrophorus Hookeri
(Moore)

Govindoo del:

G. Winchester del & lith: Madras.

ACROPHORUS.

ACROPHORUS HYMENOPHYLLUS. (Parish). Caudex creeping, furnished with numerous long wiry roots—fronds subglabrous membranaceous very flaccid and transparent ovate or deltoid-ovate pinnate, lower pinnæ deeply pinnatifid with the lower basal segments much the largest, and again pinnatifid with the segments entire or crenated, the remaining pinnœ pinnatifid with the segments crenated. Sori at the apex of the superior veinlets of each segment, indusium as in the genus veins terminating within the margin.

This very delicate species was discovered near Moulmein, by the Rev. Parish, to whom I am indebted for the specimen figured.

Hab. Moulmein.

PLATE No. XCVI.

Acrophorus hymenophyllus.
(Parish.)

Govindoo del. | G. Winchester del & lith: Madras.

ACROPHORUS.

ACROPHORUS PARVULUS. (Wall.) Caudex long, creeping, clothed with lax subulate scales, frond very small deltodi tripinnatifid glabrous rigid (from the stout costa), segments linear throughout, slightly grooved above when dry, unequally forked and acute at the apices, sori at the sinus of the forks, involucres suborbicular, dilated above and broader than the segments. *Hook. Sp. Fil.* i. 160. *Wall. Cat. n.* 247. *Hook. Et. Grev. Ic. Fil. f.* 138 ;—Leucostegia, *J. Sm.*

The specimen figured is from the Calcutta Herbarium, but unfortunately not in fructification.

Hab. Singapore, Borneo, Java.

PLATE No. XCVII.

Acrophorus parvulus
(Wall:)

Govindoo del:

G. Winchester del. & lith. Madras.

ACROPHORUS.

ACROPHORUS MEMBRANULOSUS. (Wall.) Caudex hispid, with very long slender subulate rigid membranaceous scales, fronds small, very thin and membranaceous ovato-lanceolate and as well as the slender stipes and rachis pubescenti-hirsute bipinnate pinnæ alternate lanceolate, their rachis winged, pinnules lanceolate pinnatifid, the segments ovato-lanceolate subfalcate, very acute entire or rarely toothed, involucres small, ovato-subrotund acute, very thin and membranaceous fixed by the broad base, the rest free. *Hook. Sp. Fil.* i. 159. *Wall. Cat. n.* 255.

The figure is taken from Sir W. Hooker's "Species Filicum."

Hab. Nepal.

PLATE No. XCVIII.

Acrophorus membranulosus
(Wall.)

Govindoo del.

G. Winchester del & lith: Madras.

HUMATA. (See "Ferns of Southern India," p. 4.)

HUMATA PARALLELA. (Wall.) Caudex creeping, paleaceous, fronds stipitate coriaceous ovato-lanceolate acuminate deeply pinnatifid nearly to the rachis, segments close parallel, horizontally patent linear or linear-oblong subfalcate entire, the lowermost pair sometimes with a solitary obtuse lobe at the base beneath, rarely more, involucres semiorbicular copious marginal, but all pointing towards the apex of the segments in two close parallel lines (not pointing towards the margins), veins thickened sunk. *Hook. Sp. Fil.* i. 153. *Wall. Cat. n.* 251 ;—Nephrodium Gaimardianum. *Gaud, in Freyc. Voy. Bot. t.* 12. *f.* 1.

The specimen figured is from Birmah—(Parish).

Hab. Singapore, Birmah, Moluccas, Sandwich Islands, Luzon.

PLATE No. XCIX.

Humata parallela
(Wall:)

Govindoo del:

G. Winchester del & lith: Madras.

HUMATA.

HUMATA HETEROPHYLLA. (Sm.) Caudex long, creeping, scaly and hispid with the long reflexed points of the scales, fronds coriaceous, stipitate arising from a scaly bulb, sterile ones oblong or ovato-lanceolate acuminate entire often waved, fertiles ones linear-lanceolate, acuminate deeply sinuato-pinnatifid, the lobes horizontal crenate, involucres reniform copious on the crenatures of the lobes. *Hook. Sp. Fil.* i. 152. *Sm. Act. Taur.* v. *p.* 415. *Willd. Sp. Pl.* v. *p.* 565. *Sw. Syn. Fil. p.* 130 *and* 337. *Hook. et. Grev. Ic. Fil. p.* 230 ;—Humata ophioglossa, " *Cav. Prœl.* 1801. *n.* 678 ;"—Davallia pinnatifida, *Sw. Syn. Fil. p.* 130. *Willd. Sp. Pl.* v. *p.* 465 ;—Humata pinnatifida, " *Cav. Prœl.* 1801. *n.* 679 ;"—Davallia lobulosa, *Wall. Cat. n.* 241.

The specimen figured is from Singapore.

Hab. Singapore, Penang, Malay Islands, Java, Isle Samar.

PLATE No. C.

Humata heterophylla
(Sm:)

Govindoo del:

G. Winchester del & lith: Madras.

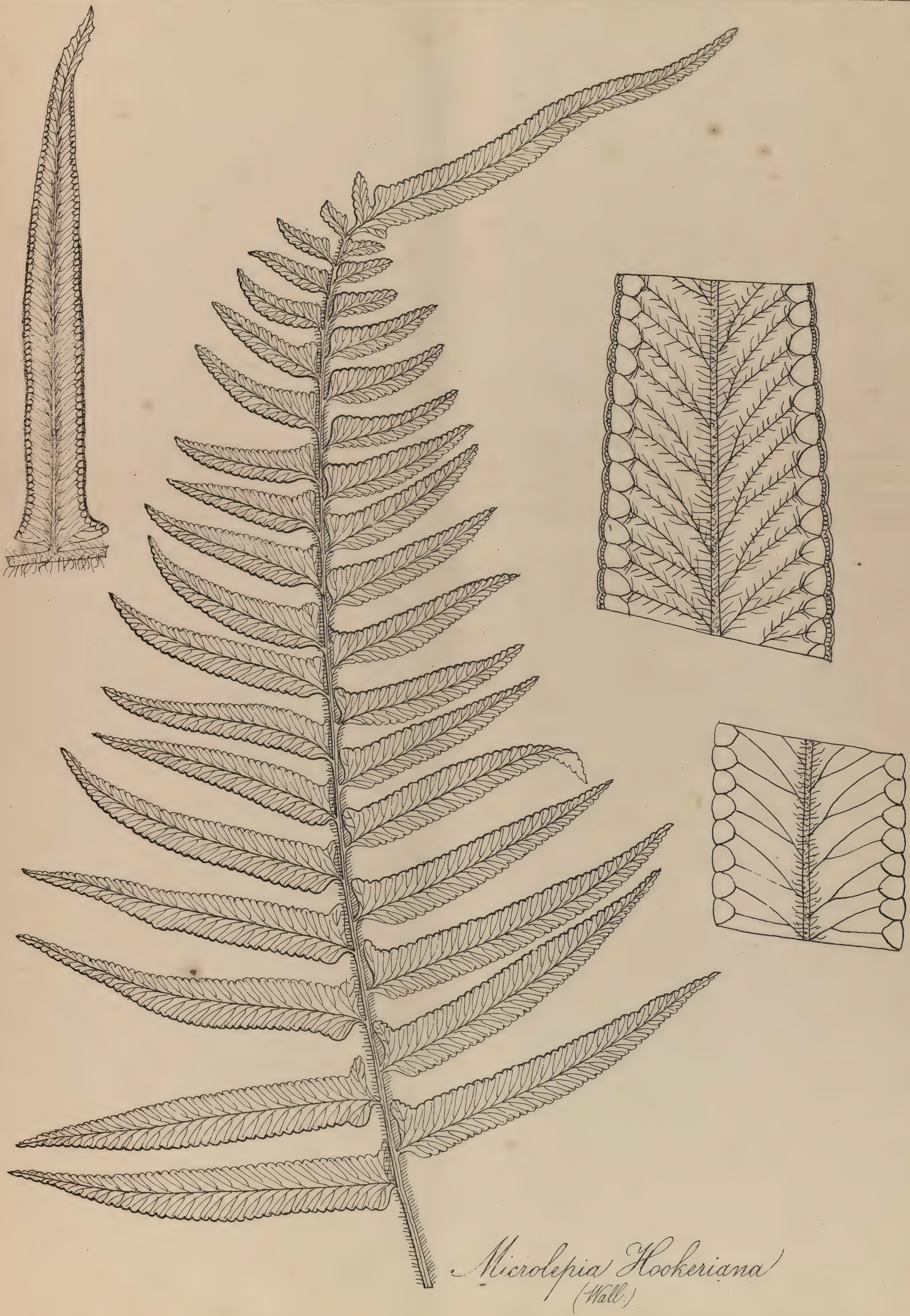
MICROLEPIA. (See "Ferns of Southern India," p. 5.)

MICROLEPIA HOOKERIANA. (Wall.) Stipes a foot and more long, pubescent at length glabrous rachis hirusto-pubescent, fronds lanceolate pinnate, pinnæ subpetiolate lanceolate from a broad hastate base, gradually acuminated submembranaceous, duplicato-crenated sparingly hairy on the costa and veins beneath, veins parallel dichotomous, sori approximate, forming a continued line at the base of the crenatures of the margin, involucres half-cup-shaped, stipes and rachis pubescenti-hirsute. *Hook. Sp. Fil.* i. 172, *Wall. Cat. n.* 2684.

The specimen figured is from the Khasya Hills—(Dr. Thomson.)

Hab. Khasya, Sylhet, Kumaon, Assam.

PLATE No. CI.



Govindoo del.

G. Winchester del & lith. Madras.

MICROLEPIA.

MICROLEPIA SCABRA. (Don.) Fronds broadly ovato-lanceolate firm membranaceous, pinnæ elongate lanceolate sub-falcate acuminate pinnatifido-lobate, the acuminated apices serrated, pubescenti-villous beneath, most so on the costa and prominent veins unequally cuneate at the base and subpetiolate, lobes acute crenato-dentate, veins pinnated, sori solitary in the axils of the smaller and upper lobes or serratures and distant from the margin, marginal on the small teeth of the larger lobes, involucres broad half-cup-shaped, densely villous, rachis and stipes downy, the latter at length glabrous. *Hook. Sp. Fil.* i. 172;—Davallia villosa. *Wall. Cat. n.* 244—(*not Don.*)

The specimen figured is from the Khasya Hills—(Dr. Thomson.)

Hab. Himalayas, Nepal.

PLATE No. CII.

Microlepia scabra
(Don.)

Govindoo del.

G. Winchester del & lith. Madras.

MICROLEPIA.

MICROLEPIA UROPHYLLA. (Wall.) Fronds, (tufted ?) tall lanceolate firm membranaceous, pinnæ elongate lanceolate subfalcate acuminate pinnatifido-lobate, the apices serrated, everywhere glabrous except the costa beneath which is pubescent, unequally cuneate at the base and distinctly petiolate, lobes acute crenato-dentate, veins pinnated, sori along the toothed margin of the lobes, involucres shallow, half-cup-shaped glabrous, or ciliate rachis and stipes slightly downy; the latter at length glabrous;—Davallia calvescens. *Wall. Cat. n.* 2983. *Hook. Sp. Fil.* i. 172;—Davallia urophylla. *Wall. Cat. n.* 2683.

The specimen figured is from the Khasya Hills—(Dr. Thomson.)

Hab. Khasya, Kumaon.

PLATE No. CIII.

PLATE CIII.

Microlepia urophylla (Wall:)

Govindoo del:

G. Winchester del & lith: Madras.

DAVALLIA. (See "Ferns of Southern India," p. 5.)

DAVALLIA SOLIDA. (Sw.) Tall, caudex stout, creeping, clothed with densely imbricated scales, fronds coriaceous tri-sub-quadri-pinnate, pinnæ acuminate, pinnules trapeziform acuminate, pinnatifid many-veined, terminal ones crenato-serrate coadunate into an acuminated point, involucres linear-oblong, sunk in a tooth or segment having a narrow wing on each side or entire. *Hook. Sp. Fil. i.* 163. *Sw. Syn. Fil. p.* 132 *and* 345. *Willd. Sp. Pl.* v., *p.* 470. *Schkh. Fil. i.* 126 ;—" D. procera, *Hedw. Fil. Fasc.* iv. *tab.* (*in descr.* elegans") *fide Sw.*——variety β. *latifolia* ; pinnules wider, soriferous segments entire (without terminal teeth) ;—D. ornata, *Wall. Cat. n.* 246 ;—Stenolobus ornatus Pr. (*name only*) ——variety γ. *caudata* ; pinnæ narrower, apices of the pinnules long caudate, involucres with a small incurved terminal tooth on one or both sides, sometimes entire. *D. caudata, Wall. Cat. n.* 2220 *an Sw. ?*—Stenolobus Kunzeanus, *Pr. Tent. Pterid. p.* 130. *t.* 4. *f.* 30, (*name and figure only*) ;—" D. elegans, *Kze. herb. nec. Swartz*," (*Pr.*) ;—D. solida β. lacera, *Bl. En. Fil. Jav. p.* 234 ;—Trichomanes solidum, *Forster*, *Prodr. n.* 475.

The specimen figured is from Moulmein—(Parish.)

Hab. Pacific Islands, Otaheite, New Islands, Pitcairns Island, Malden Island, Java, Moulmein, Penang, Singapore, Luzon, Island of Vanicoro.

PLATE No. CIV.

PLATE CIV_

Davallia solida (Sw.)

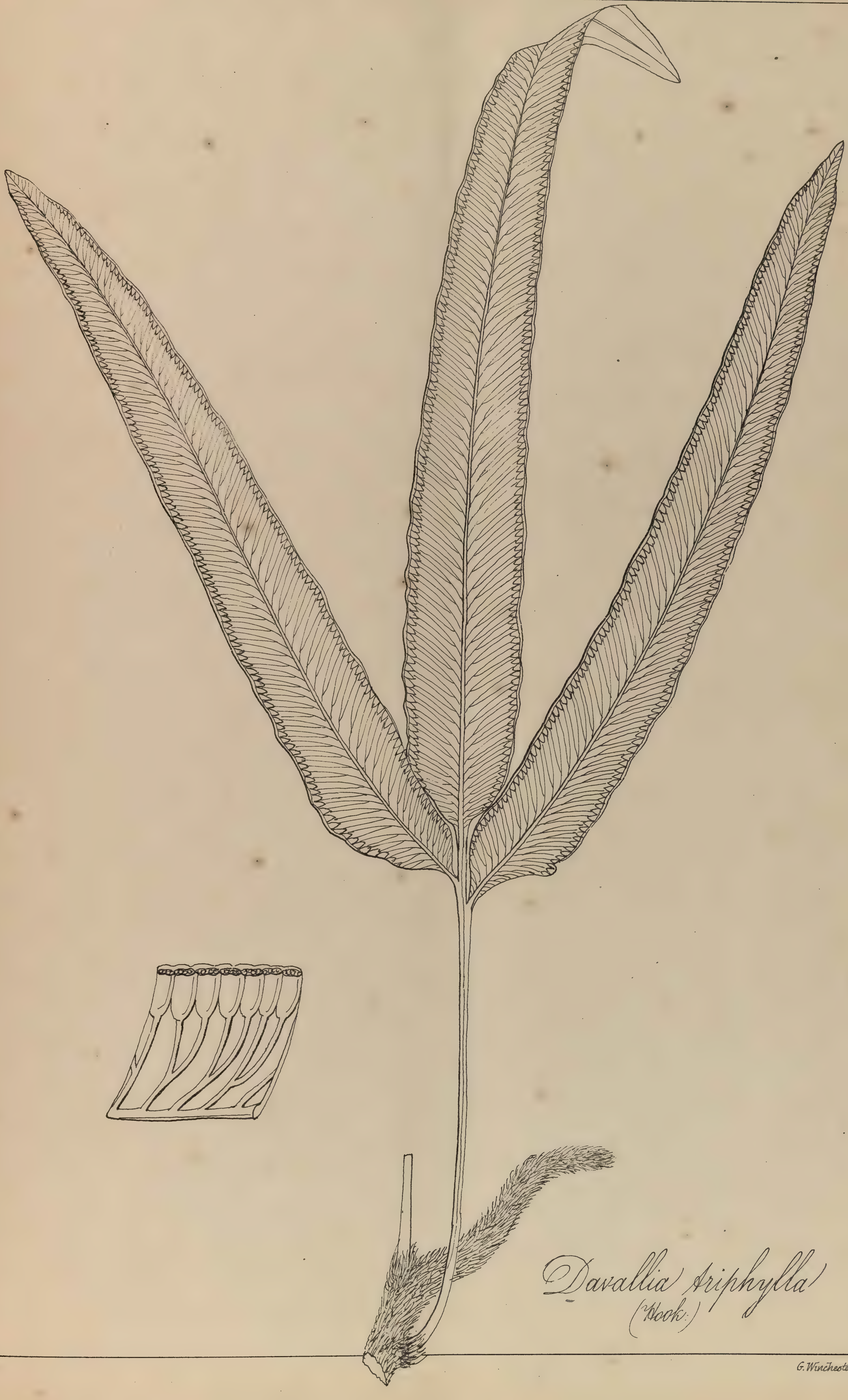
Govindoo del.   G. Winchester del & lith. Madras.

DAVALLIA.

DAVALLIA TRIPHYLLA. (Hook.) Caudex stout, creeping, covered with chaffy scales, fronds coriaceous small ternate, pinnæ oblong-lanceolate, obtuse cuneate at the base, in fertile plants more elongated, all of them entire, intermediate ones petiolate, lateral ones shorter sessile oblique at the base, veins horizontally patent copious crowded parallel forked thickened flat (not prominent), involucres semicylindrical compressed, crowded so as to form an uninterrupted marginal line the whole length of the pinnæ. *Hook. Sp. Fil. i.* 162 ;—Stenolobus pentaphyllus. *J. Sm. En. Fil. Phillip. l. c.*—(*not* Davallia pentaphylla, *Bl.*)

Hab. Singapore.

PLATE No. CV.



Davallia Triphylla
(Hook.)

Govindoo del.

G. Winchester del & lith Madras.

DAVALLIA.

Davallia Griffithiana, (Hook). Caudex long stout creeping, clothed with copious pale-coloured shaggy fimbriato-pilose scales, frond deltoideo-ovate sub-coriaceous, tripinnate, pinnæ acuminate, pinnules oblong lanceolate petiolulate obtuse, obliquely cuneate at the base pinnatifid, lower ones again pinnate, lobes short, obtuse or retuse, almost obsolete on the lower margin, involucres flat orbiculate, the upper half free placed at a distance from the apex of the lobules and chiefly upon those of the superior margin, rachides (except the primary ones) winged, stipes elongated.—β more coriaceous, with a faint appearance of striæ or pseudo-veins.—*Hook. Sp. Fil.* i, 168.

The figure is taken from Sir W. Hooker's Species Filicum.

Hab. Khasya, Assam.

PLATE No. CVI.

Davallia Griffithiana
(Hook)

ovindoo del: G. Winchester del & lith Madras.

DAVALLIA.

DAVALLIA POLYANTHA, (Hook). Tall coriaceous, frond 3-4 pinnate, pinnæ distant, ovato-lanceolate acuminate, lower pinnules deeply pinnatifid almost to the rachis petiolate, upper ones and the segments of the pinnules oblong, rather acute, ultimate ones decurrent, so as to form a winged rachis, all of them crenato-serrate, veins pinnated ; no striæ, each lobule bearing an oval truncated involucre rather considerably below the apex, with a very short erect tooth on the outside (often obsolete).—*Hook. Sp. Fil.* i. 168.

The figure is taken from Sir W. Hooker's Species Filicum.

Hab, Singapore.

PLATE No. CVII.

Davallia polyantha.

(Hook.)

Govindoo del.

G. Winchester del & lith Madras.

POLYPODINEÆ.

B. Receptacles effuse, occupying a crowded mass of reticulated veinlets, forming large amorphous portions or separate lobes of the fronds or sometimes definite in form. . . . . . . PLATYCERIEÆ.

PLATYCERIUM, *(Desvaux, Ann. Soc. Lin. Par. vi.* 213.*)*

(Neuroplatyceros. *Plukenet. Fée.* ;—Alcicornium, *Gaudichaud* ;—Scutigera, *Fée.* ;—Platyceria, *Fée* ;—Acrostichi Sp:, *Auct.*)

Sori superficial, non-indusiate ; the *receptacles,* (a series of crowded anastomosing veins), occupying the under-surface of separate lobes or large amorphous portions of the fertile fronds. *Veins* furcate, free, or here and there anastomosing ; *venules* anastomosing in large trapezoid or sub-hexagonal elongated areoles ; the veinlets free, divaricate or hamate within the areoles.

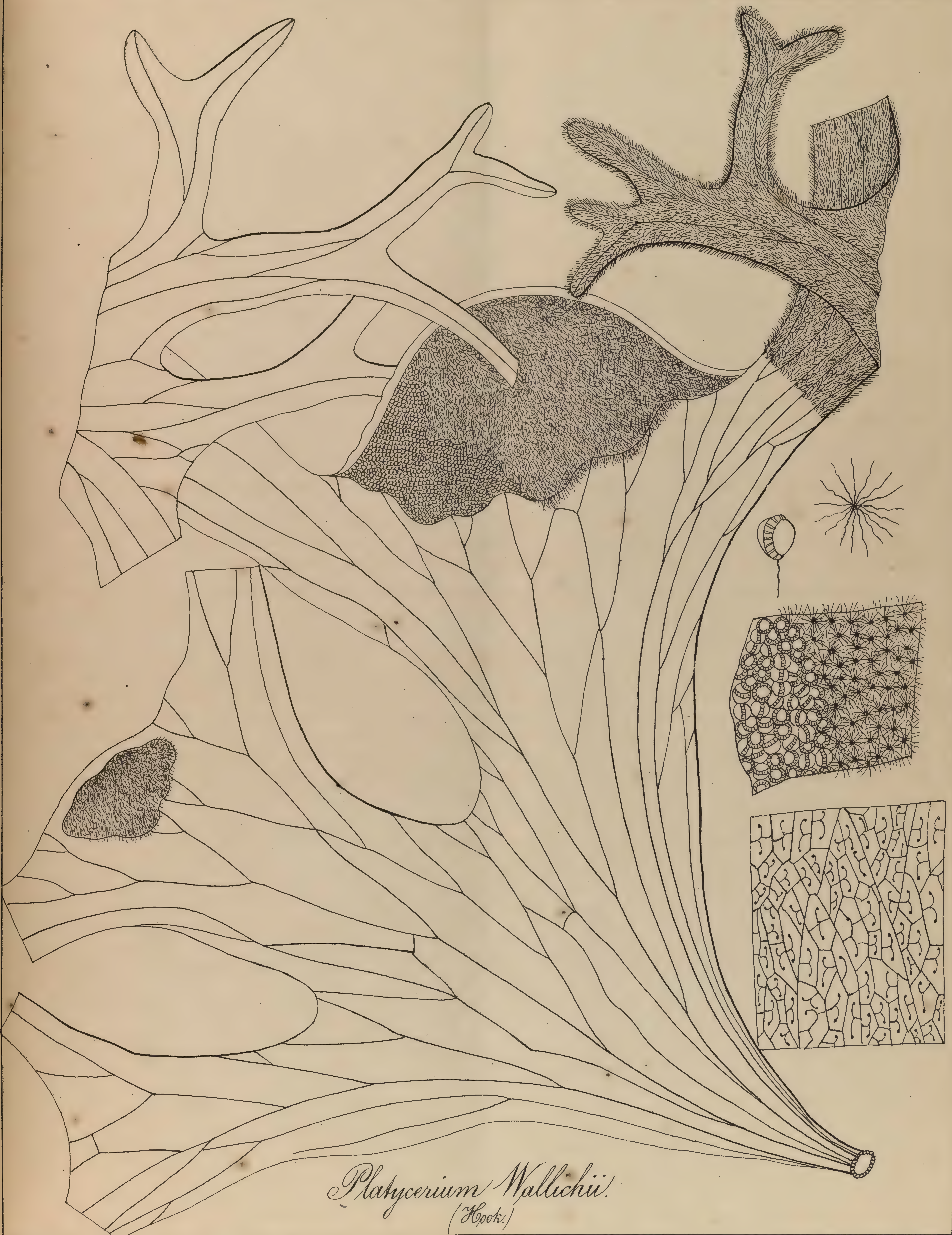
Fronds heteromorphous, coriaceous, laciniate or lobate, clothed with stellate hairs ; the fertile ones articulate. Rhizome subglobose. A very distinct group. The primary veins rarely unite, while the secondary ones are compoundly anastomozed.—(*Moore.*)

PLATYCERIUM WALLICHII, (Hook). Fronds ample, bifarious, at length glabrous; sterile ones imbricated below, irregularly sinuato-lobate above elongated, dilated deeply and much dichotomously pinnatifid. Segments patenti-inflexed ; *fertile* fronds geminate very broadly flabellato-cuneate twice—dichotomous suddenly narrowed at the base, each primary division or segment bears a sorus on the disk (hence there are two sori on each frond), which is semi-circular and very much produced in the sinus itself, the terminal segments beyond the soriferous disk are several times dichotomous and pendent, primary veins dichotomous, parallel elevated here and there, anastomosing into broad elongated areoles which are occupied by lesser ones with numerous free-branched included veinlets.—*Hook. Sp. Fil.* v. 284.—*Hook. in Gard. Chron. for Oct.* 1858, *p.* 765, *and in Fil. Exot. t.* 97.—Acrostichum alcicorne, *Wall. Cat. n.* 19. (*not Linn.*)

The specimen figured is from Moulmein—(Parish).

Hab. Moulmein, banks of Irawaddy, and river Martaban, Malay, Peninsula.

PLATE No. CVIII.



Platycerium Wallichii.
(Hook.)

Govindoo del.

G. Winchester del & lith: Madras.

PLATYCERIUM.

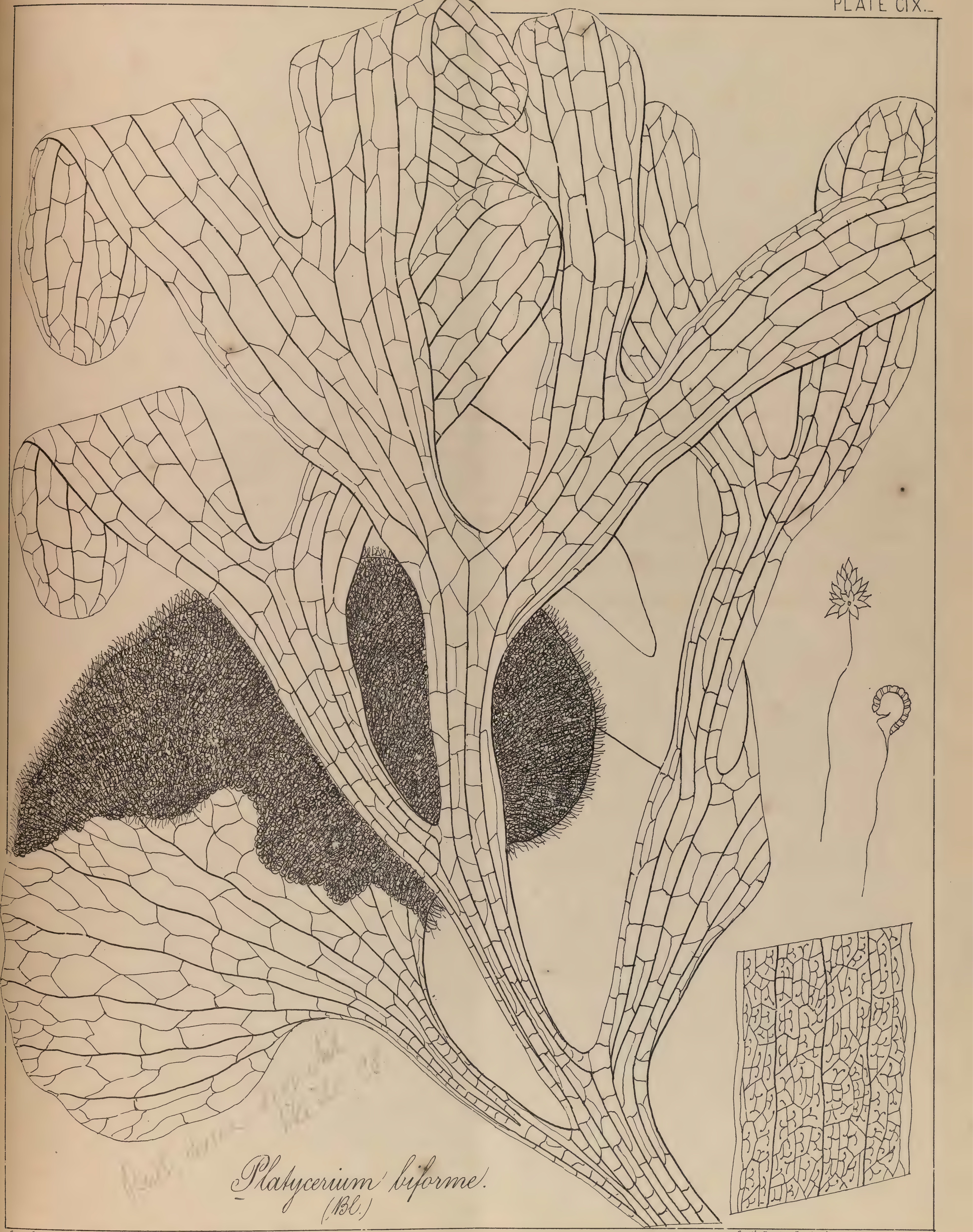
PLATYCERIUM BIFORME, (Bl.) Fronds ample, bifarious at length glabrous ; *sterile* ones imbricated, very thick and corky towards the base, subrotund but very varied in circumscription, lobed and sinuated at the margin, coarsely reticulato-venose ; *fertile* fronds (geminate ?) rather long—stipitate of great size, 5-6 and more feet long !—from a subcuneate base repeatedly dichotomous the segments loriform flaccid and pendent, fertile segments quite different from the rest, forming a large reniform stipitate shield-like receptacle 6-8 inches or more in diameter, wholly soriferous beneath, except at the margin.—*Hook. Sp. Fil. v.* 285 ; *Bl. Fil. Jav. p.* 14. *t.* 18., *Pr. J. Sm. Hook. in Gard. Chron. for* 1858, *p.* 764 ;—Neuroplatyceros, *Fée. Acrost. p.* 104 ;—Acrostichum, *Sw. Syn. Fil. p.* 112, *Willd. Sp. Pl. v. p.* 111 ;—A fuciforme, *Wall. Cat. n.* 20 ;—Platycerium coronarium, *Desv.*

The specimen figured is from Java, (Calcutta Herb.)

Hab. Burmah, Mergui, Singapore, Malay Peninsula and Islands, Java, Borneo, Philippine Islands.

PLATE No. CIX.

PLATE CIX.



Platycerium biforme.
(Bl.)

Govindoo del

G. Winchester del & lith. Madras.

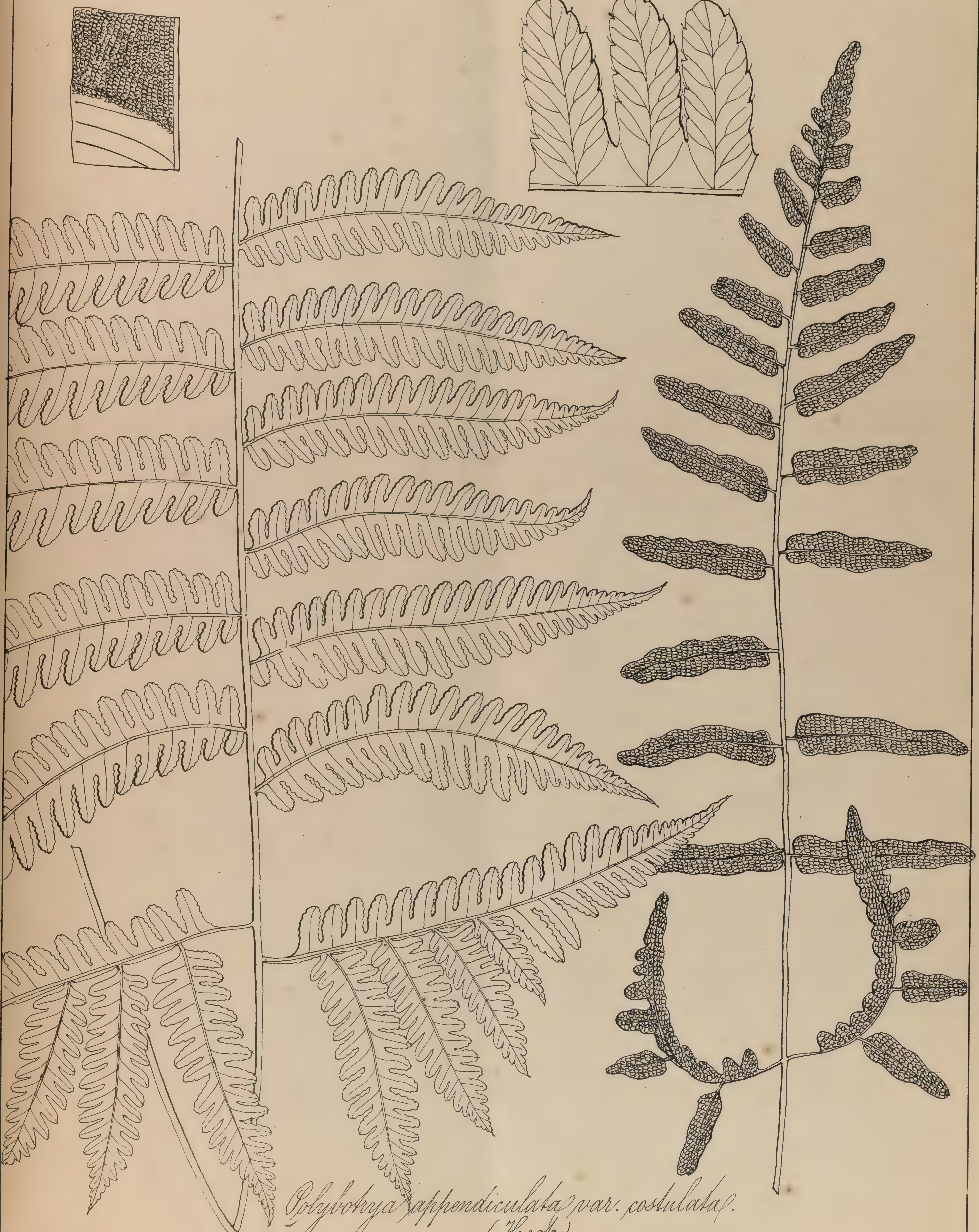
POLYBOTRYA. (See "Ferns of Southern India," p. 66.)

POLYBOTRYA APPENDICULATA. *Var: y. β costulata.* (Hook.) Sterile pinnæ deeply pinnatifid $\frac{1}{2}$-$\frac{3}{4}$ of the way to the rachis, costulate with simple patent veins, lowest pair of pinnæ half-deltoid, bi-pinnate at the base, pinnules $1\frac{1}{2}$ to $3\frac{1}{2}$ inches long, deeply pinnatifid, like the primary pinnæ, fertile pinnæ also with the lower pair in like manner pinnated as in the sterile fronds.—(*Hook.*)

The specimen figured is from Moulmein, from Mr. Parish, who informs me that he considers it quite distinct as a species from B. appendiculata, of which, however, Sir W. Hooker considers it a variety only—it is a beautifully delicate plant.

Hab. Moulmein.

PLATE No. CX.



Polybotrya appendiculata var. costulata.
(Hook)

Govindoo del:

G. Winchester del & lith Madras.

POLYBOTRYA.

POLYBOTRYA APPENDICULATA, (Wild.) (See " Ferns of Southern India," p. 66.)

The plate contains figures of 3 different varieties of this species, all received from Moulmein, from Mr. Parish. The second supposed species common in India and published in Plate CXCV. of "The Ferns of Southern India," under the name of *P. aspleniifolia*, (Bory.) must, I am afraid, be looked upon only as a variety of appendiculata.

PLATE No. CXI.

Polybotrya appendiculata.
(Willd.) varieties.

Govindoo del:

G. Winchester del: & lith Madras.

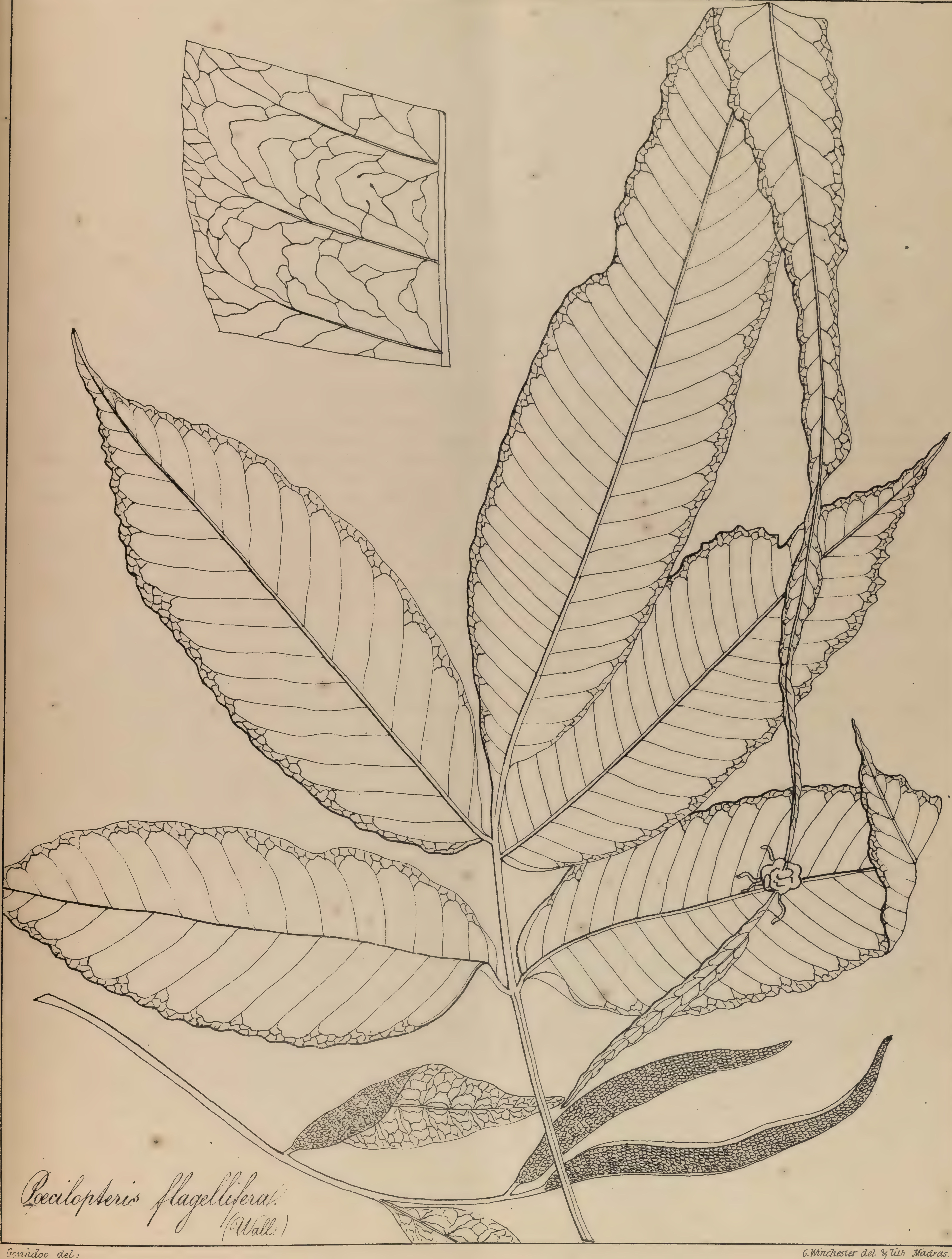
PÆCILOPTERIS. (See "Ferns of Southern India," p. 68.)

PÆCILOPTERIS FLAGELLIFERA, (Wall.) Caudex creeping, paleaceous, thick as a goose quill, stipites a span to a foot and more long (longer of the fertile frond), scaly at the base, fronds firm-membranaceous, a span to 1-2 feet long pinnate, pinnæ commonly 3-5, rarely more ; *sterile* pinnæ, 3-5 inches long, 1½-2 inches wide ; subelliptical or oblongo-lanceolate, lateral ones rather suddenly acuminate entire or sinuato-crenate, subcuneate at the base and petiolate, terminal one similar to these but larger, and petiolate or more generally very much elongate and caudate, a foot or 1½ 2 feet long ! rooting and proliferous at the apex, venation manifest, costules rather wide apart, veins anastomozing, always forming a series, of oblong large areoles close to the costa and costules, nearly uniform in size and shape, the rest of the areoles very irregular and with or without free included simple veinlets ; *fertile* pinnæ much smaller, 2-3 inches long, oblong obtuse ; occasionally the cauda of the terminal sterile pinnæ becomes fertile, and the lateral *sterile* pinnæ partially soriferous, the capsules in that case chiefly confined to the costules and near to the margin.—*Hook. Sp. Fil.* v. 258. ;—*Hook. and Grev. Ic. Fil. t.* 23. ; *Bl. Fil. Jav.* p. 104, *t.* 13. ; Cyrtogonium, *J. Sm.* ;—A heteroclitum, *Pr.* ; Pæcilopteris, *Pr.* ;—Heteroneuron, *Fée. Acrost.* p. 92 ;—Acrostichum diversifolium, *Bl. Fil. Jav. p.* 36, *t.* 12 ? (*sterile frond simple*) !—Cyrtogonium, *J. Sm.* ;—Heteroneuron, *Fée, Acrost.* p. 91. (*excl. syn.* ;—Gymnopteris trilobata, *J. Sm.* ;)—Pæcilopteris, *Pr. Rheede. Hort. Malab.* x. ii *t.* ii.

The specimen figured is from Assam—(Dr. Thomson).

Hab. Nepal, Assam, Chittagong, Moulmein, Java, Luzon, Malabar (if Sir W. Hooker is correct in referring Rheede. Hort, Malab. xii. *t.* ii. to this plant—but I have never detected it any where in Malabar)

PLATE No. CXII.



Poecilopteris flagellifera. (Wall.)

Govindoo del:

G. Winchester del & lith Madras.

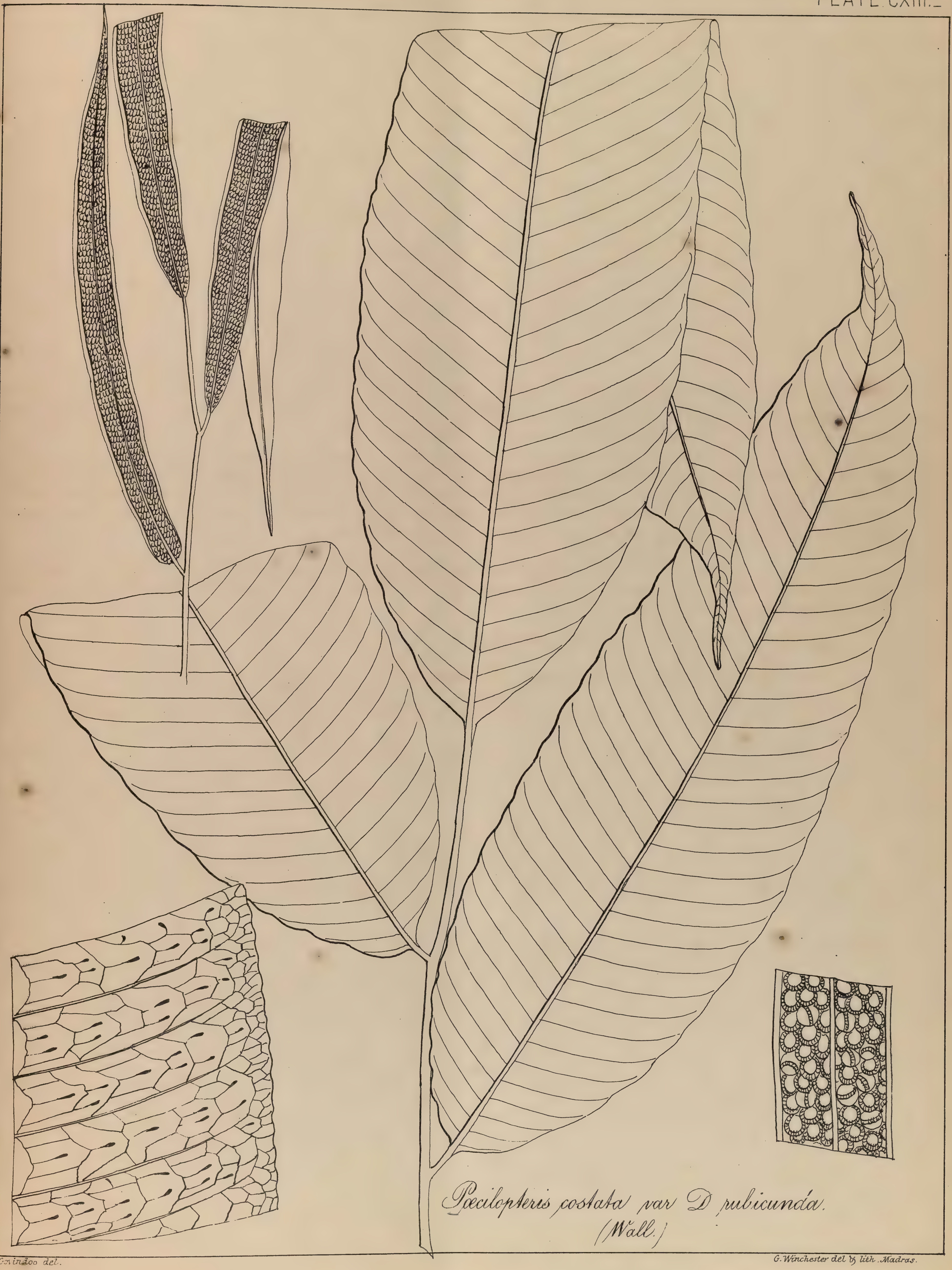
PÆCILOPTERIS COSTATA. (Wall.) Caudex creeping, subulato-paleaceous, stipites 1-1½ and more feet long, striated and often here and there rusty-furfuraceous, fronds 1-1½ or more feet long, coriaceous or subcoriaceo-membranaceous, very pale-green pinnated, pinnæ petiolate of the *sterile* frond 7-10 inches long, 1-2 inches broad, oblong acuminate, obtusely and obliquely cuneate at the base, entire sinuato-crenate at the margin, costules horizontal, and costa prominent beneath, primary veins arched and forming three or four or more series, (according to the breadth of the pinnæ) of very irregular but sub-transverse large areoles, within which are lesser deltoid areoles, including two or more clavate free veinlets, free veinlets also at the margin ; pinnæ of the *fertile* fronds generally smaller, 2-3-6 inches long, more coriaceous but nearly of the same form, wholly or partially soriferous, the margin sometimes reflexed, costules very distinct and prominent beneath, venation less compound. *Hook. Sp. Fil.* v. 262.

Var. *a, rubicunda ;* pinnæ very large, subcoriaceous often finely acuminated, 8-12 inches long, frequently deeply tinged with purple-red wholly soriferous beneath, fertile ones 6-9 inches long, ½ an inch wide ;—A. costatum, *Wall. Cat. n.* 26 ;—Cyrtogonium, *J. Sm.* ;—Pœcilopteris, *Moore* ;—Campium, *Pr.*

The specimen figured is from Assam—(Dr. Thomson).

Hab. Nepal, Sylhet, Assam, Khasya, Kumaon, and Chittagong.

PLATE No. CXIII.



Pœcilopteris costata var D rubicunda.
(Wall.)

Govindoo del.

G. Winchester del & lith. Madras.

PÆCILOPTERIS.

PÆCILOPTERIS COSTATA. (See p. 113.)

Var. β, DELTIGERUM ; small, sori partial, generally marginal and interrupted, spots or masses forming transverse lines between the costules, frequently having a deltoid form. *Hook. Sp. Fil.* v. 262 ;—Meniscium deltigerum. *Wall. Cat. n.* 59.

The specimen figured is from Birmah—(Captain Dormer).

Hab. Nepal, Bhotan, Sikkim, Birmah.

PLATE No. CXIV.

Pœcilopteris costata var β deltigera. (Hook)

Govindoo del.   G. Winchester del & lith. Madras.

PÆCILOPTERIS.

PÆCILOPTERIS COSTATA. (See, p. 113).

Var. γ. UNDULATA; resembling var. *β*, but the sori frequently only marginal, forming a broad band, but often extending a little way down between the costules towards the costa, the disk of the pinnule naked; Nothochlæna undulata. *Wall. Cat. n.* 140;—Jenkinsia, *Hook. Gen. Fil. t.* 75, *Moore*;—Campium. *Pr.*;—Cyrtogonuim, *f. Sm.*;—Lomariopsis, *Metten*;—Heteroneuron sculpturatum, *Fée, crost p.* 95, *t.* 56, *judging from the figure*—(*Sori universal on the pinnæ*).

The specimen figured is from Moulmein—(Parish).

Hab. Martaban, Moulmein, Khasya, Sikkim.

PLATE No. CXV.

Pœcilopteris costata - var. γ undulata.
(Hook.)

Govindoo del:

G. Winchester del & lith Madras.

GYMNOPTERIS. (See "Ferns of Southern India," p. 15).

GYMNOPTERIS MINUS (Metten). Small caudex creeping, thick as a sparrow's quill, scaly at the apex, stipites remote slender 1-3 or in those of the fertile frond 4 inches long; *Sterile* fronds membranaceous, $1\frac{1}{2}$-2 inches long, oblong or broad—lanceolate costate tapering into a stipes $2\frac{1}{2}$ inches long, costules indistinct, areoles with a free included clavate, veinlet smaller towards the margin; *fertile* fronds 2 inches long, linear obtuse.—*Hook. Sp. Fil. v.* 277. *Metten. Fil. Hort. Lips.*, *p.* 20;—Leptochilus, *Fée. Acrost. p.* 87, *t.* 47, *f.* 2. *according to his figure* (*excl. Syn. J. Sm.*);—Gymnopteris, *Hook. 2nd Cent. of Ferns*, *t.* 78.

The specimen figured is from Khasya—(Calcutta Herb.)

Hab. Khasya near Churra, alt. 2,000 = 3,000 feet, Isle of Samar, Philippines.

PLATE No. CXVI.

PLATE CXVI.

Gymnopteris minus.
(Mett.)

Govindoo del. G. Winchester del & lith: Madras.

TÆNIOPSIS. (See " Ferns of Southern India," p. 18.)

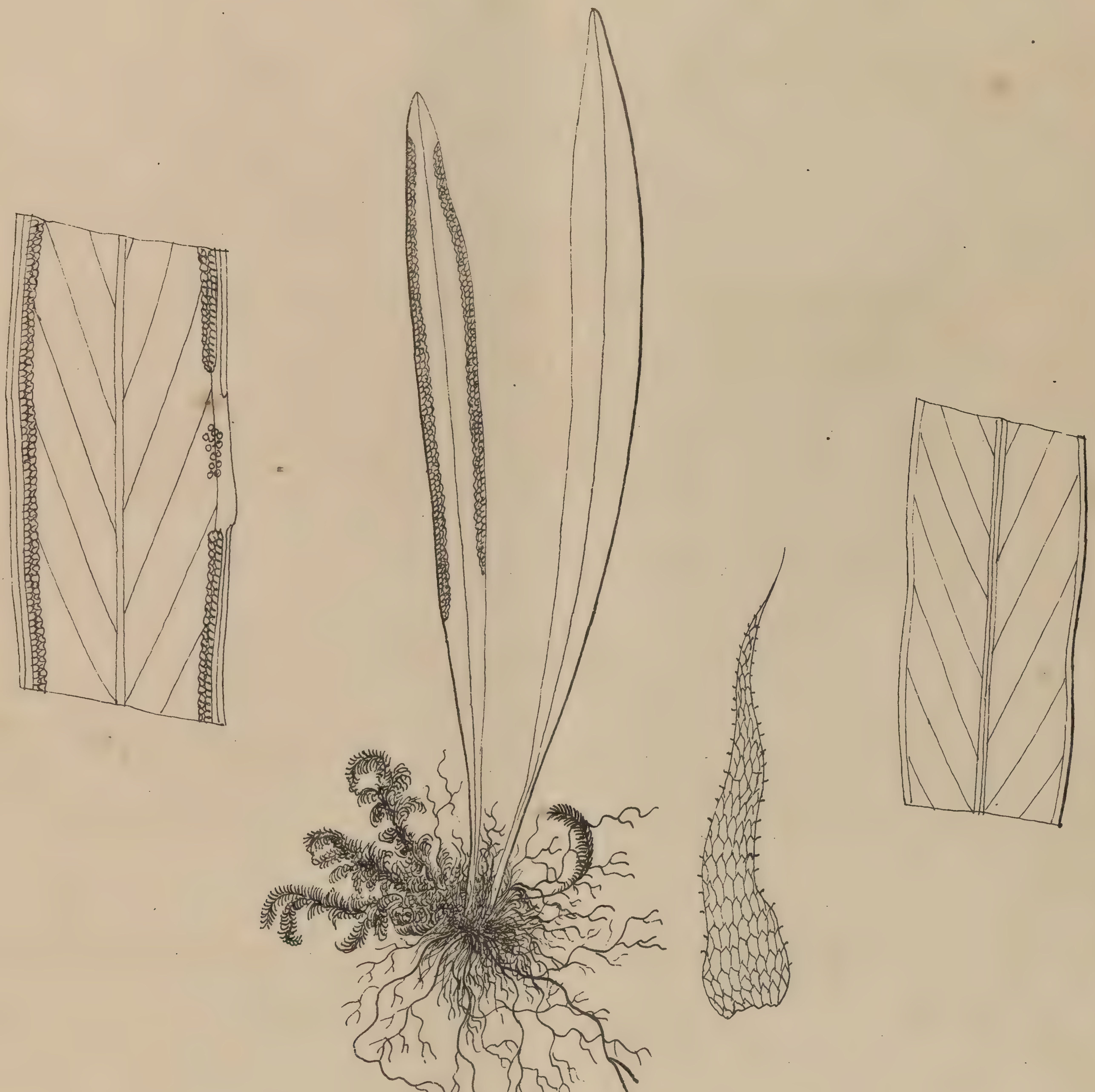
TÆNIOPSIS AMBOINENSIS (Fée.) " Fronds smooth, submembranaceous, falcate acuminate tapering below into a petiole, costa slender, disappearing below the apex, veins curved equal approximate, sori closely marginal, cuticle of the margin resembling a false involucre, caudex flexuose, contorted scaly, scales cancellate, rigidly toothed at the margin."—*Hook. Sp. Fil. v.* 177. *Fée. Vittar. p.* 44, *t.* 1, *f.* 1.

The veins are combined where fertile by an intra-marginal vein which runs along the centre of the receptacle, I could not, however make out from my solitary specimen if this vein is present where the frond or portion of the frond is sterile.

The specimen figured is from Birmah—(Parish.)

Hab. Birmah, Amboyna.

PLATE No. CXVII.



Tœniopsis Amboinensis.

(Fee.)

Govindoo. del.

G. Winchester del & lith. Madras.

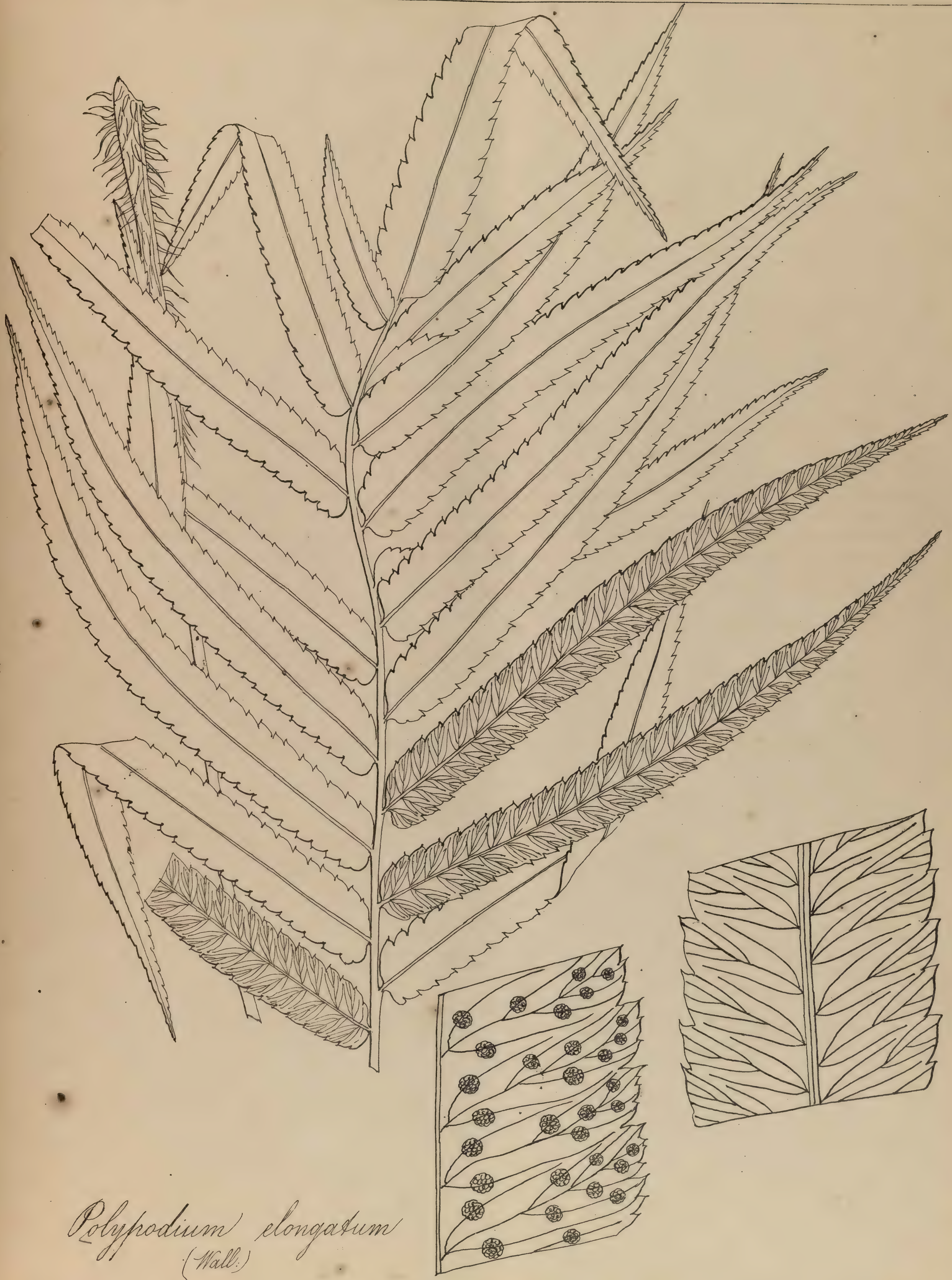
POLYPODIUM. (See "Ferns of Southern India," p. 55).

POLYPODIUM ELONGATUM. (Wall.) Caudex? stipes 1-1½ foot and more long, stout tawny-brown, very paleaceous below with dark castaneous glossy falcato-subulate long acuminated scales, fronds ample, 2 feet and more long, 6-10 inches and more broad, thin firm-coriaceous ovato-oblong acuminated pinnated to the very apex, pinnæ numerous, more or less patent and distant. 5-10 inches long, ½ an inch broad subpetiolate from an obliquely cuneate, but not dilated, (rarely subauricled) base linear or elongato-oblong, finely acuminated, the margin pinnatifid subduplicato-serrated, serratures subspinose, terminal pinnæ like the rest but more petiolate, veins copious fasciculato-pinnate, veinlets each of them bearing a dorsal sorus, and thus copious and irregularly scattered over the back of the frond or in irregular series. *Hook. Sp. Fil.* iv. 234. *Wall. Cat. n.* 309 ;—Aspidium cuspidatum, *Metten. Aspid. p.* 92.

The specimen figured is from Khasya— (from the Ceylon Herb.)

Hab. Nepal, Khasya.

PLATE No. CXVIII.



Polypodium elongatum
(Wall.)

Govindoo del.

G. Winchester del & lith. Madras

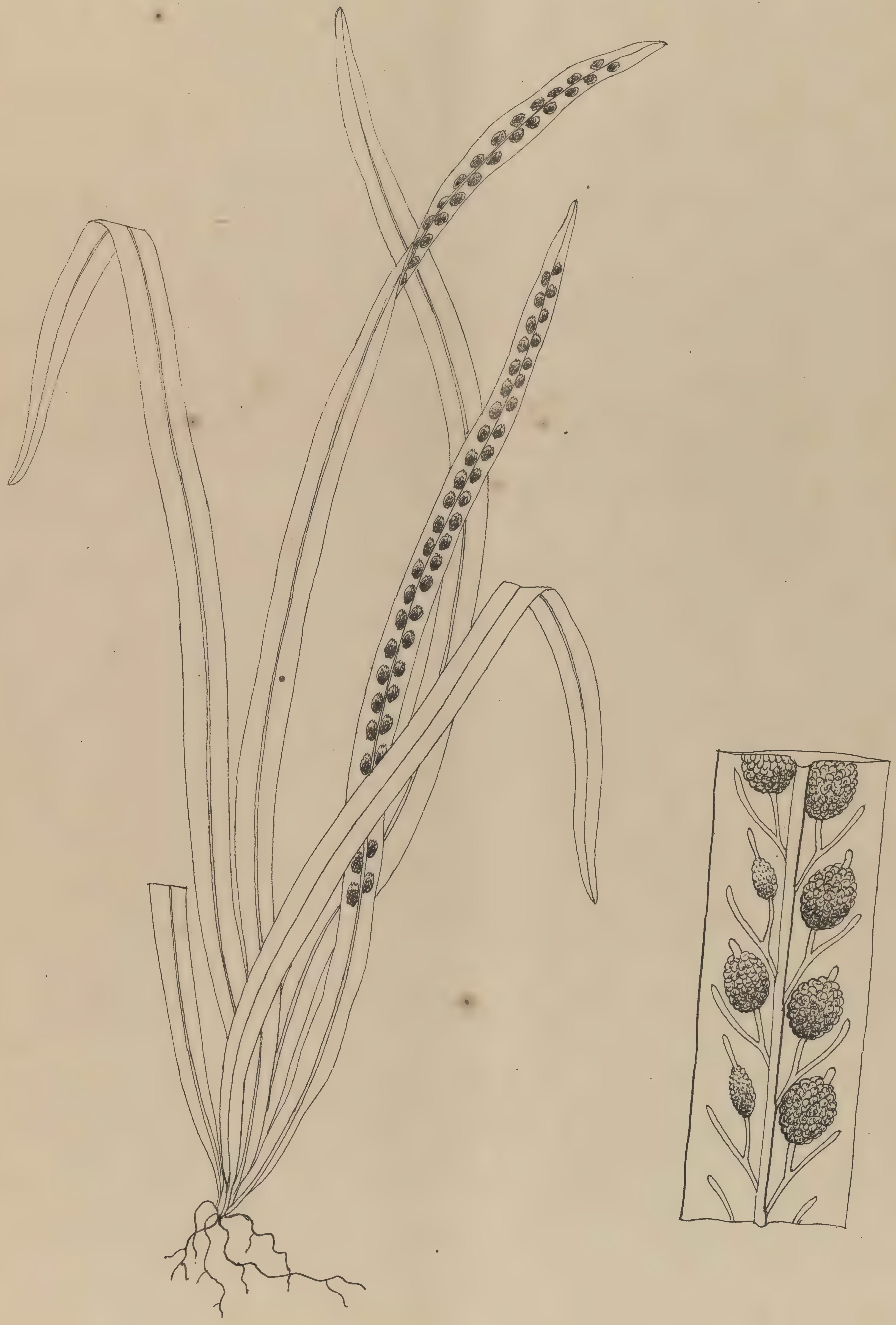
POLYPODIUM.

POLYPODIUM SESSILIFOLIUM. (Hook.) Caudex small, erect or ascending scaly, stipites scarcely any, fronds tufted membranaceous firm 3-8-9 inches long, 2-3 lines wide, linear scarcely acuminated obtuse attenuated at the base, veins oblique, approximate simple, sori oblong, parallel with the costa in lines or series intermediate between the costa and the margin. *Hook. Fil.* iv. 168.

The figure is taken from Sir W. Hooker's Sp. Fil.

Hab. Penang, Luzon, Java.

PLATE No. CXIX.



Polypodium sessilifolium.
(Hook.)

Govindoo del. G. Winchester del & lith Madras.

NIPHOBOLUS. (See " Ferns of Southern India," p. 61.)

NIPHOBOLUS COSTATUS. (Wall.) Caudex creeping, rufo-paleaceous with slender subulate scales, stipites sub aggregate, 1 inch to a span long angled, fronds a span to $1\frac{1}{2}$-2 feet and more long, 1-2-3 inches and more broad firm (but not apparently carnoso)—coriaceous even sub-membranaceous, in age glabrous above, beneath densely stellato-tomentose and subfurfuraceous (tomentum forming a close coat), lanceolate or suboblanceolate acuminate, gradually tapering below and decurrent upon the stipes, primary veins or costules distinct, elevated on the under side, sori immersed, very minute and numerous, arranged in compact closely placed lines or series between the costules and in equally-compact series tranversely with them. *Hook. Sp. Fil.* v. 50. *Wall. Cat. p.* 265. *Metten. Polyp. p.* 131, *t.* 3, *f.* 14, (*venation*) ;—Niphobolus, *Pr.* ;—Apalophlebia, *Pr. Epim. p.* 138 ;—Niphob. venosus, *Bl. Fil. Jav. p.* 63, *t.* 28 *(very good, but small fronds)*;—Apalophlebia, *Pr. Epim. p.* 139.

The specimen figured is from Moulmein—(Parish).

Fig. A shows the venation (between the costules) considerably magnified.

Hab. Nepal, Khasya, Assam, all along the Himalayas, from Kumaon to Sikkim, Moulmein, Java, New Guinea.

PLATE No. CXX.

Govindoo del.

G. Winchester del & lith Madras.

NIPHOBOLUS.

NIPHOBOLUS PENANGIANUS. (Hook.) Caudex ? Stipes scarcely any, fronds submembranaceous, $1\frac{1}{2}$ foot and more long, $2\frac{3}{4}$ inch wide, oblanceolate finely acuminate, the base much and gradually attenuated sessile, the margin irregularly sinuated glabrous above (at least in maturity), beneath thinly clothed with fuscous stellated hairs, venation internal, but manifest when viewed between the eye and the light, costules not elevated, areoles 16-18 between the costa and the margin including 2 to 4 simple or forked clavate soriferous veinlets, sori prominent (not sunk), forming a broad mass in the disk of the upper half of the frond arranged with great regularity in four longitudinal series parallel with the costules and within each areole are transverse lines, each of four sori, capsules mixed with long-stipitate peltate stellated scales. *Hook. Sp. Fil.* v. 52. *Hook. Ic. Pl.*, *t.* 203, *Gen. Fil.* 83. *Polycarpium*, *Pr:*

The specimen figured is from Birmah—(Parish).

Hab. Birmah, Penang.

PLATE No. CXXI.

PLATE. CXXI.

Niphobolus Penangianus.

(Hook.)

Govindoo del. Soobroy lith. Madras.

PLEOPELTIS. (See "Ferns of Southern India," p. 57.)

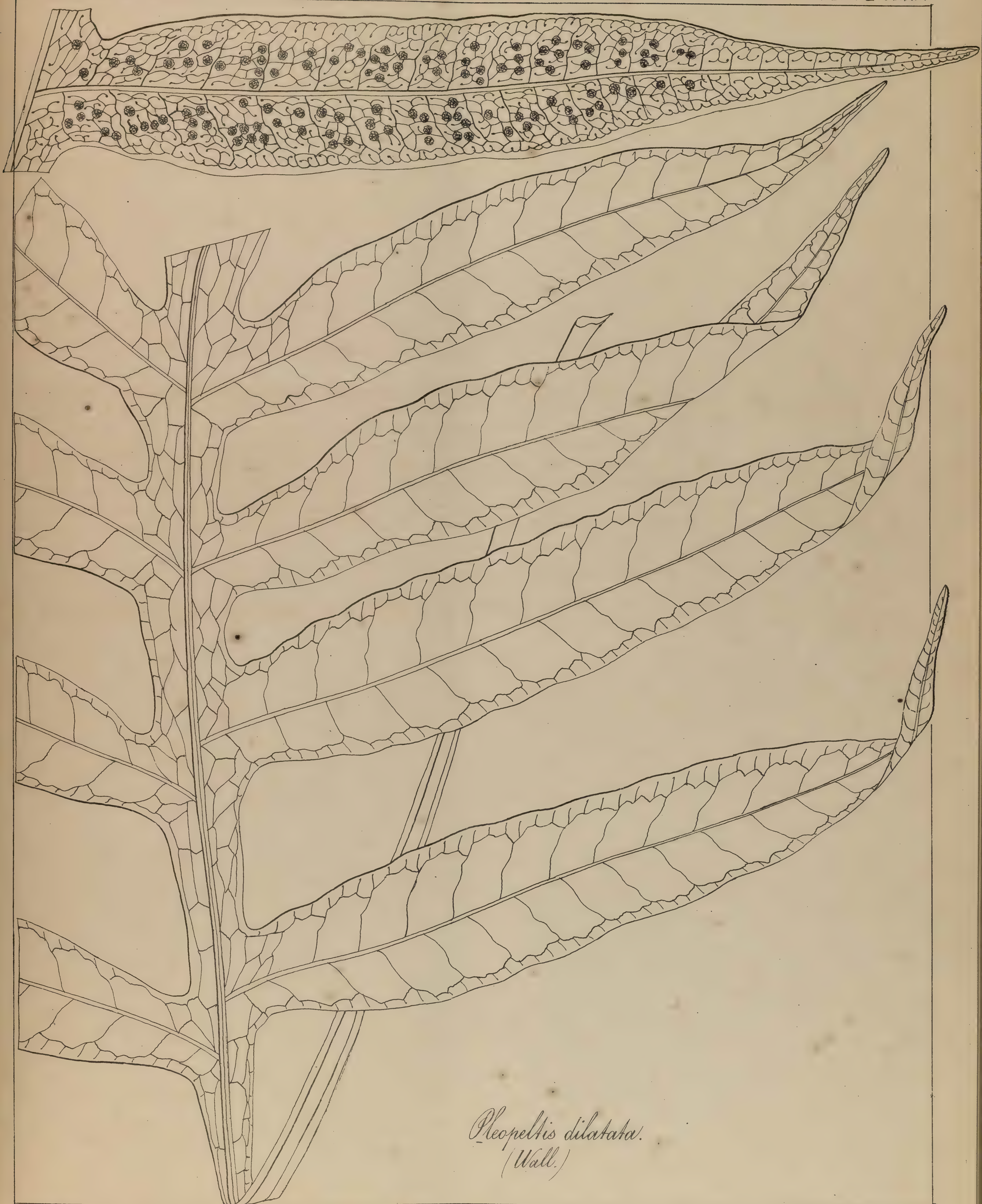
PLEOPELTIS DILATATA. (Wall). Caudex creeping (short ?), paleaceous with ovate reticulated scales, stipites 1½ foot and more long, but strongly winged for its whole length by the decurrent base of the frond (not articulated on the caudex), fronds ample 1½-2 and 3 feet long, a foot and more wide, membranaceous light-green, glabrous oblongo-ovate pinnatifid to within ½-1 inch of the rachis (less towards the base), segments 5-6 or 8 inches long (shorter towards the apex), ¾-1 rarely 2 inches wide, oblongo-lanceolate acuminate entire suddenly decurrent, costules veniform forming large primary areoles which extend two-thirds of the way to the margin and include the sori, these and the rest of the segments are occupied by lesser irregular areoles including many free veinlets, their branches moderately divaricating, sori numerous, very small, often oval or more or less elongated, compital on the secondary veins and veinlets. *Hook. Sp. Fil.* v. 85. *Wall. Cat. n.* 295 ;—Drynaria acuminata ? *Brack. Fil. U. S. Expl. Exp., p.* 47.

The specimen figured is from Moulmein—(Parish.)

Hab. Nepal, Khasya, 4,000 6,000 feet, Malacca, Malay Peninsula, Moulmein, ascent of Mooleit, alt. 4,000 feet, Samoa Navigator's Islands.

PLATE No. CXXII.

PLATE. CXXII.



Pleopeltis dilatata.
(Wall.)

Govindoo del: Soobroy lith. Madras.

PLEOPELTIS.

PLEOPELTIS ZOSTERIFORMIS. (Wall.) Caudex short, fragile black, creeping apparently under ground or rather under water, scaleless, stipites very slender, weak and filiform, $\frac{1}{2}$-1 inch long aggregated, fronds 4-6 inches long less than $\frac{1}{4}$ of an inch wide, carnoso-membranaceous black when dry, linear vittarioid scarcely acuminate, subacute entire, gradually long-attenuated below into the thread-like stipes, costa prominent beneath and scaly with blackish appressed somewhat fleshy small ovate scales, venation very distinct when seen between the eye and the light, costules none, veins anastomosing, so as to form 2-3 series of large parallel but very irregular areoles with no free veinlets. Sori in a single but irregular series between the costa and the margin, capsules lax. *Hook. Sp. Fil.* v. 65. *Wall. Cat. n.* 280. *Metten. Polyp. p.* 86 (*venation.*)

Nearly allied to P. tridactylon. Wall. at least to the Southern Indian form.

The specimen figured is from Birmah—(Parish.)

Hab. Birmah.

PLATE No. CXXIII.

Pleopeltis zosteræformis.
(Wall.)

Govindoo del.

Soobroy lith Madras.

PLEOPELTIS.

PLEOPELTIS INCURVATA. (Bl.) Caudex creeping, paleaceous, stipites scattered a span to a foot long of the *sterile* frond-2 feet of the *fertile* glossy-brown, fronds firm-coriaceous glossy dimorphous ; *sterile* ones 6-10 inches long, 8 inches to 1 foot wide, hastato, tripartite simply ovate or pinnatifid with 4-6 lateral lobes, lobes ovato-acuminate entire horizontal, terminal one very large, all thickened at the margin, costules distinct but immersed, venation internal and very indistinct ; *fertile* fronds very long, stipitate 10 inches to a foot long, nearly as much wide, very broad, ovate deeply pinnatifid nearly to the rachis, below subpinnate, segments 5-15-4-8 inches long, very remote linear and acuminate decurrent at the base, sori large, copious oval sunk into a very deep cavity which forms a circular elevated truncated tubercle on the opposite side, occupying the space between the costa and the margin in a single series. *Hook. Sp. Fil.* v. 77. *Bl. Fil. Jav., p.* 151., *t.* 65. *Metten. Polyp., p.* 106, *t.* 1, *f.* 30 (*venation.*)

The specimen figured is from the Calcutta Herbarium,

Hab. Mount Ophir, Malacca, Java.

PLATE No. CXXIV.

Pleopeltis incurvata.
(Bl.)

Govindoo del.

Soobroy lith Madras.

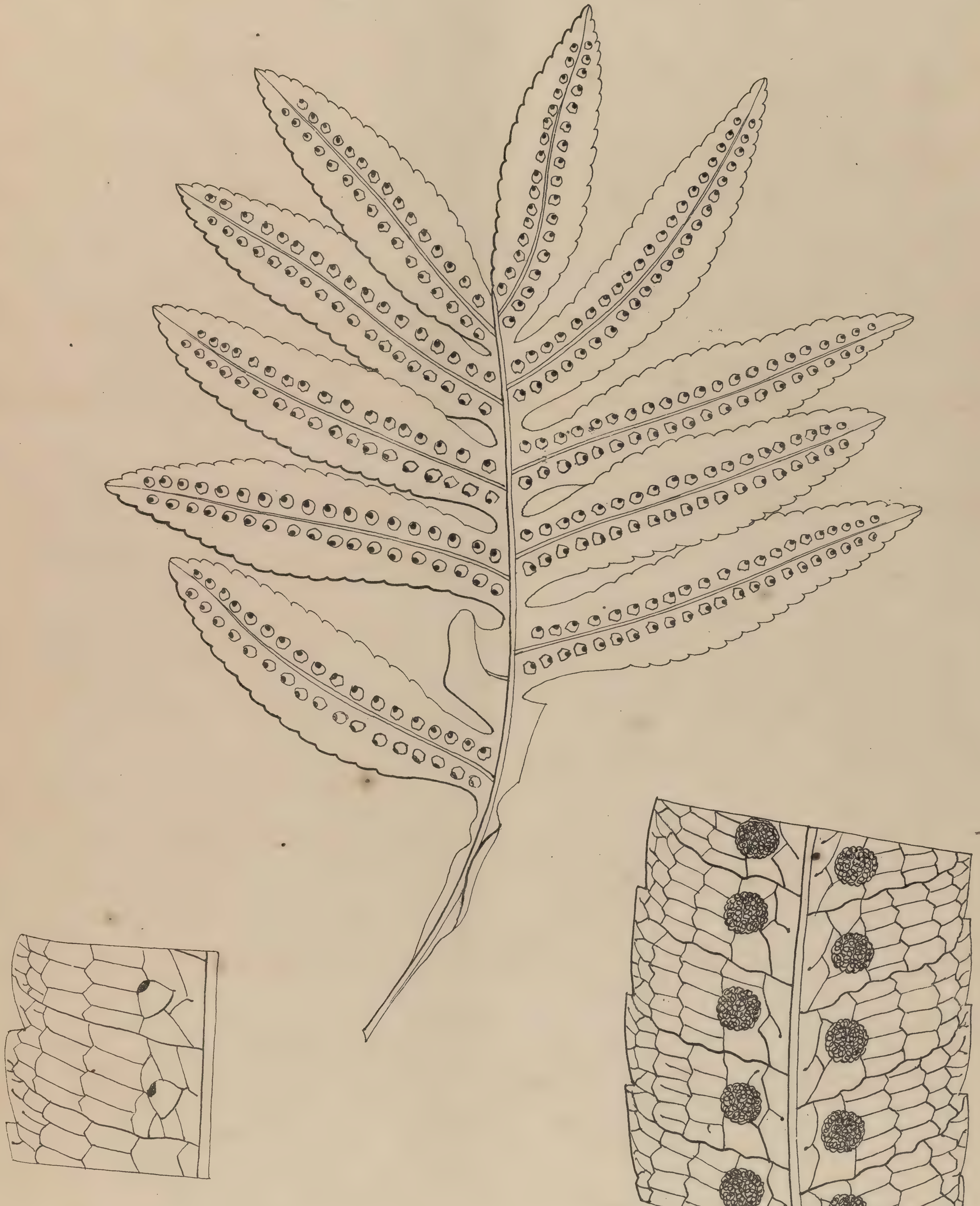
PLEOPELTIS.

Pleopeltis Parishii. (Bedd.) Caudex ? Stipites short and more or less winged with the decurrent base of the frond, fronds coriaceo-membranaceous glabrous, very broadly ovate, deeply pinnatifid segments, obtuse undulated on the margin and distantly crenated, venation very prominent, costules slightly thicker than the veins which latter form 4-5 areoles between the costa and margin, veinlets forming a very regular series of lesser parallelogrammoid areoles with rarely a few free veinlets. Sori in a single series in the second areole from the costa, deeply sunk and forming a prominent pustule on the upper surface.

The specimen figured is from Moulmein—(Parish.)

Hab. Moulmein.

PLATE No. CXXV.



Pleopeltis Parishii.

(Bedd.)

Govindoo del.

Soobroy lith Madras.

POLYSTICHUM. (See "Ferns of Southern India," p. 41.)

POLYSTICHUM THOMSONI. (Hook.) Caudex short thick scaly, stipites tufted 1-3-4 inches long paleaceous with large scales, fronds 6-8 inches long, lanceolate acuminate chartaceo-membranaceous pinnate, pinnæ sub-sessile, 1 to 4 inches long, deltoid-ovate or semi-ovate acute subauricled and deeply pinnatifid (especially at the superior margin), lobes small, ovate inciso-serrate, teeth setoso-spinulose, sori solitary on each lobe, involucre subovate membranaceous peltate pedicellate, the margin suberose. *Hook. Sp. Fil.* iv. 7. *Hook. 2nd Cent. of Ferns, t.* 25.

The specimen figured is from Sikkim—(Dr. Thomson.)

Hab. Sikkim, Himalaya, Kumaon, elev. 9 to 13,000 feet, Simla.

PLATE No. CXXVI.

Polystichum Thomsoni.
(Hook.)

Govindoo del. Soobroy lith. Madras.

POLYSTICHUM.

POLYSTICHUM SIKKIMENSE. (Bedd.) Caudex? Stipes and rachises rather copiously furnished with persistent scales, fronds ovate acuminate, subcoriaceo-membranaceous, tripinnate primary pinnæ 4-6 inches long, oblong acuminate, pinnules oblong, deeply pinnatifid, ½ an inch to 1 inch long, secondary pinnules variously pinnatifid with the segments acuminate and falcate, costa of the pinnules waved, veins simple or forked, terminating within the margin, sori generally one to each segment, involucre sub-orbicular peltate stalked, with the stalk below the centre.

The specimen figured is from Sikkim—(Dr. Thomson.)

Hab. Sikkim, Himalaya.

I forwarded specimens of this fern lately to Sir W. Hooker, who pronounced it to be an undescribed species, and informed me that he intended publishing it in his synopsis, under the name of *Nephrodium* (*L*). *Thomsoni*—the involucres, however, in specimens which I received from Dr. Thomson, and in others lately collected by Dr. Anderson are always those of *Polystichum*, and not *Lastrea*, and there is already a *Polystichum Thomsoni*.

PLATE No. CXXVII.

Polystichum Sikkimense.

(Bedd.)

Govindoo del.

Soobroy lith Madras.

POLYSTICHUM.

POLYSTICHUM LONCHITIS. (Sw.) Caudex short, stout oblique, densely paleaceous as are the short stipites, and lower portion of the rachis with ferruginous large scales, fronds 6-18 inches long, densely tufted, erect rigid lanceolate tapering at both ends pinnated, pinnæ numerous, approximate from a broad nearly sessile obliquely truncated base, ovate or lanceolate, falcate acute rather than acuminate spinuloso-serrate, the superior base truncated and auriculate, sori confined to upper portion of the frond in two or more series upon the pinnæ. *Hook. Sp. Fil.* iv. 8 *Sw. Syn. Fil. p.* 43. *Willd. Sp. Pl.* iv. *p.* 224. *Sm. Fil, Brit. p.* 1118. *Engl. Fil.* iv. *p.* 284. *Schk. Fil. p.* 29, *f.* 29, *Metten. Aspid. p.* 41. *Hook. Et. Arn. Brit. Fl. ed.* 8. *p.* 582, *Hook. Brit. Ferns. t.* 9 ;—Polypodium, *Linn. Sp. Pl. p.* 1548, *Engl. Bot. t.* 796. *Polystichum, Roth. Fl.* 1. *Germ.* iii. *p.* 71. *Presl. Moore Brit. Ferns Nat. Print, t.* 9.

The specimen figured is from the N. W. Himalaya—(Dr. Stewart.)

Hab. Temperate and cooler parts of Europe, Michigan, U. States, Lake Superior, British Columbia, N. W. India.

PLATE No. CXXVIII.

Polystichum Lonchitis.
(Sw.)

Govindoo del.
Soobroy lith Madras.

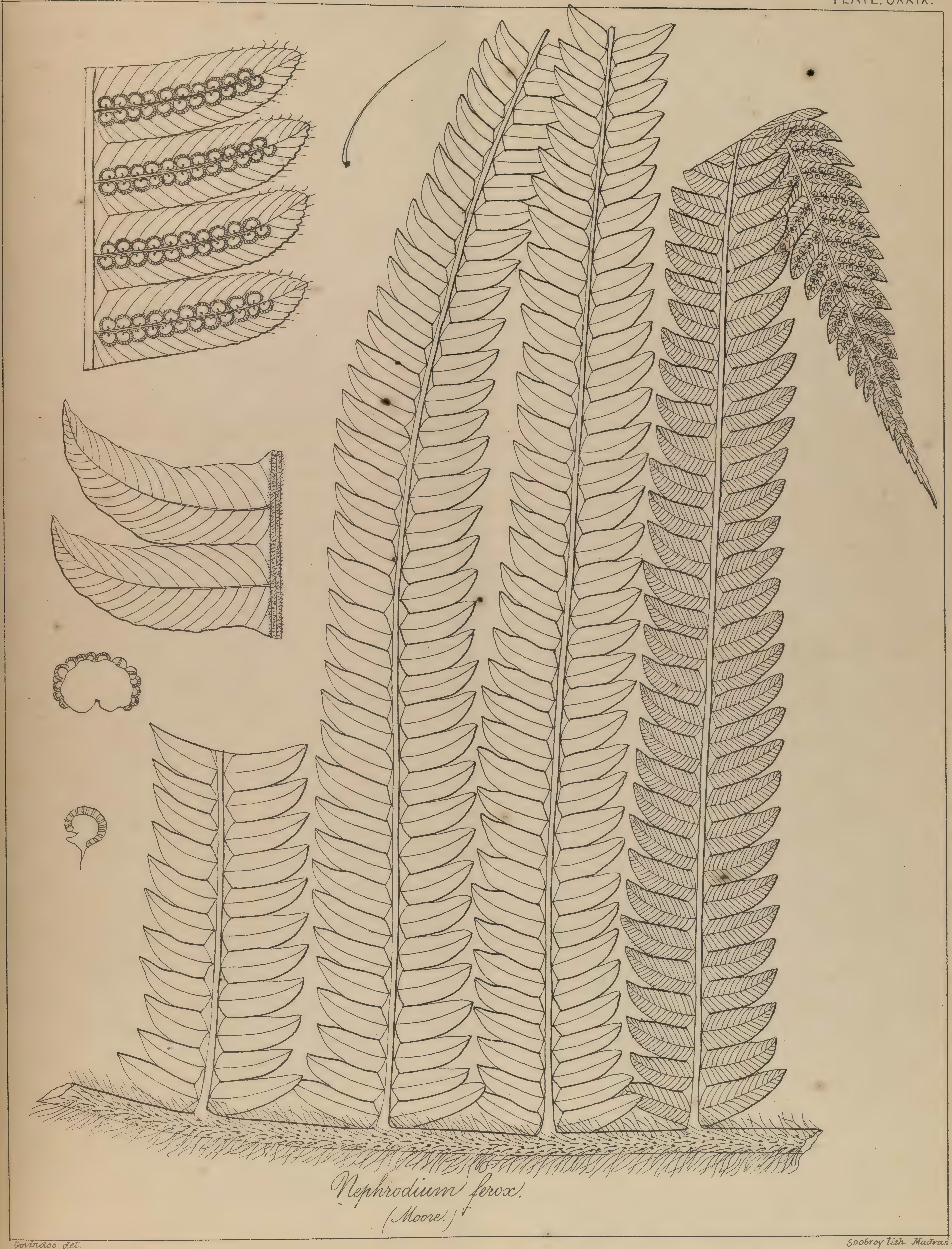
NEPHRODIUM. (See "Ferns of Southern India," p. 29.)

NEPHRODIUM FEROX. (Moore). Stipes robust, 2 and more feet long, crinite with coarse long subulate blackish scales which more or less extend to the rachides, each bristle-like hair seated on a tubercle, fronds ample, probably several feet long, very rigid and coriaceous, glossy, 2-3 feet broad, (judging by the length of the pinnæ), glabrous pinnated, pinnæ numerous, sessile approximate 1-1½ foot long, often an inch broad, sessile from a truncated base, elongato-oblong falcate finely acuminated, regularly (about one-third of the way down from the margin), pinnatifid with ovate acute pungent falcate segmen ts, costa and costules prominent beneath, veinlets close, placed, elevated, six to eight pairs united and excurrent forming a pseudo-costule as distinct as the costule from which they spring and which terminates at the sinus, sori in two rows close to the costule apparently forming a single brown transverse line or band not prolonged into the segments. *Hook. Sp. Fil.* iv. 77. *Aspidium, Bl. En. Fil. Jav., p.* 153;—Goniopteris aspera, *J. Sm. in Hook. Journ. Bot.* iii., *p.* 396;—Polypodium asperum, *Roxb. in Herb. Linn.* (*fide J. Sm.*);—P. scabrum. *Herb. Roxb.* (*fide Wall. Cat. n.* 2225.)

The specimen figured is from the Calcutta Herbarium.

Hab. Kumaon, Luzon, Java.

PLATE No. CXXIX.



Nephrodium ferox.
(Moore.)

Govindoo del. Soobroy lith. Madras.

truncatum Presl. NEPHRODIUM.

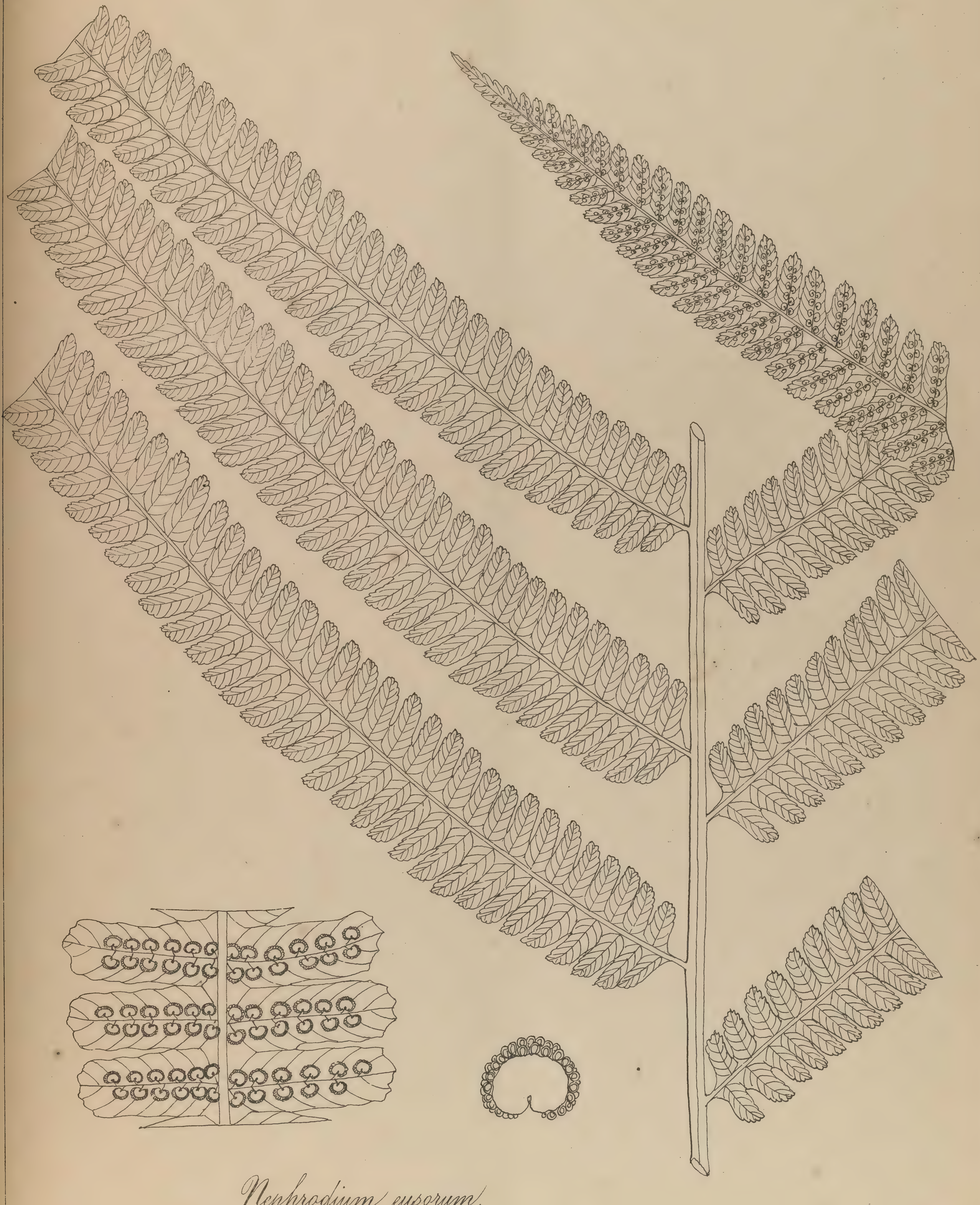
NEPHRODIUM ~~EUSORUM~~. (Thw.) Caudex short, fronds glabrous or sub-glabrous lanceolate acuminate pinnate, pinnæ numerous, linear acuminate 5-10 inch long, ½ to 1 inch broad, sub-sessile pinnatifid, generally about ½ way down to the rachis, segments truncated, unconspicuously toothed at the apex, veinlets 6-8 pair, the lower pair always and generally the 2 lower anastomosing, sori one to each veinlet a little below the middle. *Thw. En., p.* 391.

Mr. Thwaites, to whom I am indebted for the specimen of this fern, informs me that he considers it quite distinct from the Nep. abruptum (Presl.), to which species Sir W. Hooker is inclined to refer it. All my specimens of *abruptum* have the pinnæ much less divided, and 3 to 6 (never less than 3) pair of veinlets anastomose, the segments of the pinnæ are besides very different in shape. Mr. Thwaites has had both species under cultivation.

Hab. Ceylon.

PLATE No. CXXX.

Sp.s Fil. Vol.4. p.77. t.241. N. abruptum.
Synopsis Fil. p.294.-



Nephrodium eusorum.
(Thw.)

Covindoo del.   Soobroy lith. Madras.

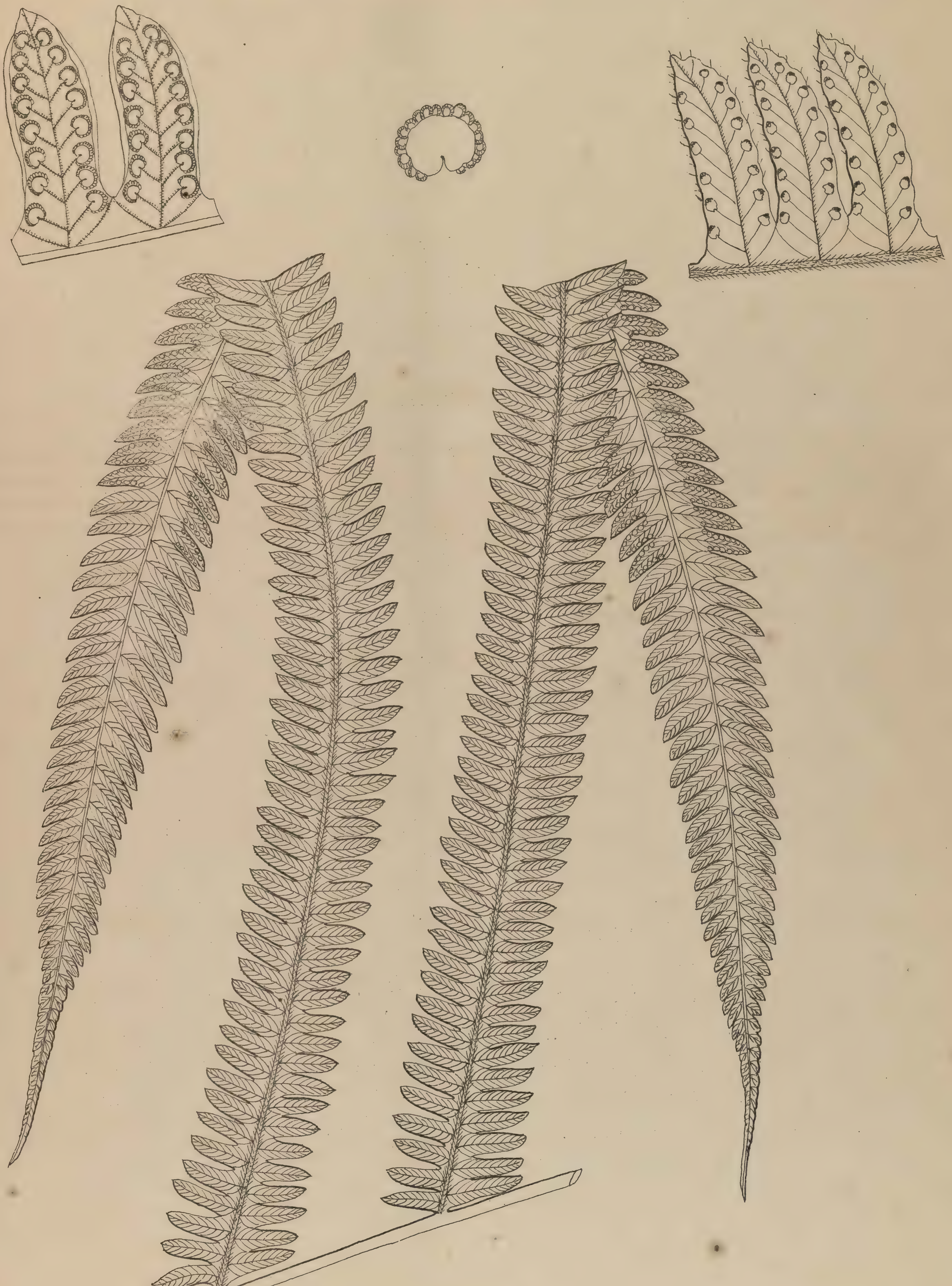
NEPHRODIUM.

NEPHRODIUM PUNCTATUM. (Parish.) Caudex a creeping rhizome, stipites solitary distant 1-2 feet long with a few small subulate scales at the base, fronds 3-4 feet high broadly ovate, pinnate throughout their whole length. Pinnæ alternate linear apiculate, from 8 inches in the lowest to 12-16 inches long ; in the centre over $\frac{3}{4}$ inches broad, becoming suddenly shorter at top of frond, pinnatifid half way to the costa-pinnules subfalcate ; sori marginal all round the pinnules sunk in the substance of the frond so as to give a punctiform appearance on the upper surface. (Parish.)

The specimen figured is from Moulmein—(Parish.)

Hab. Moulmein, damp jungles, rare.

PLATE No. CXXXI.



Nephrodium punctatum.

(Parish.)

Govindoo del. Soobroy lith Madras.

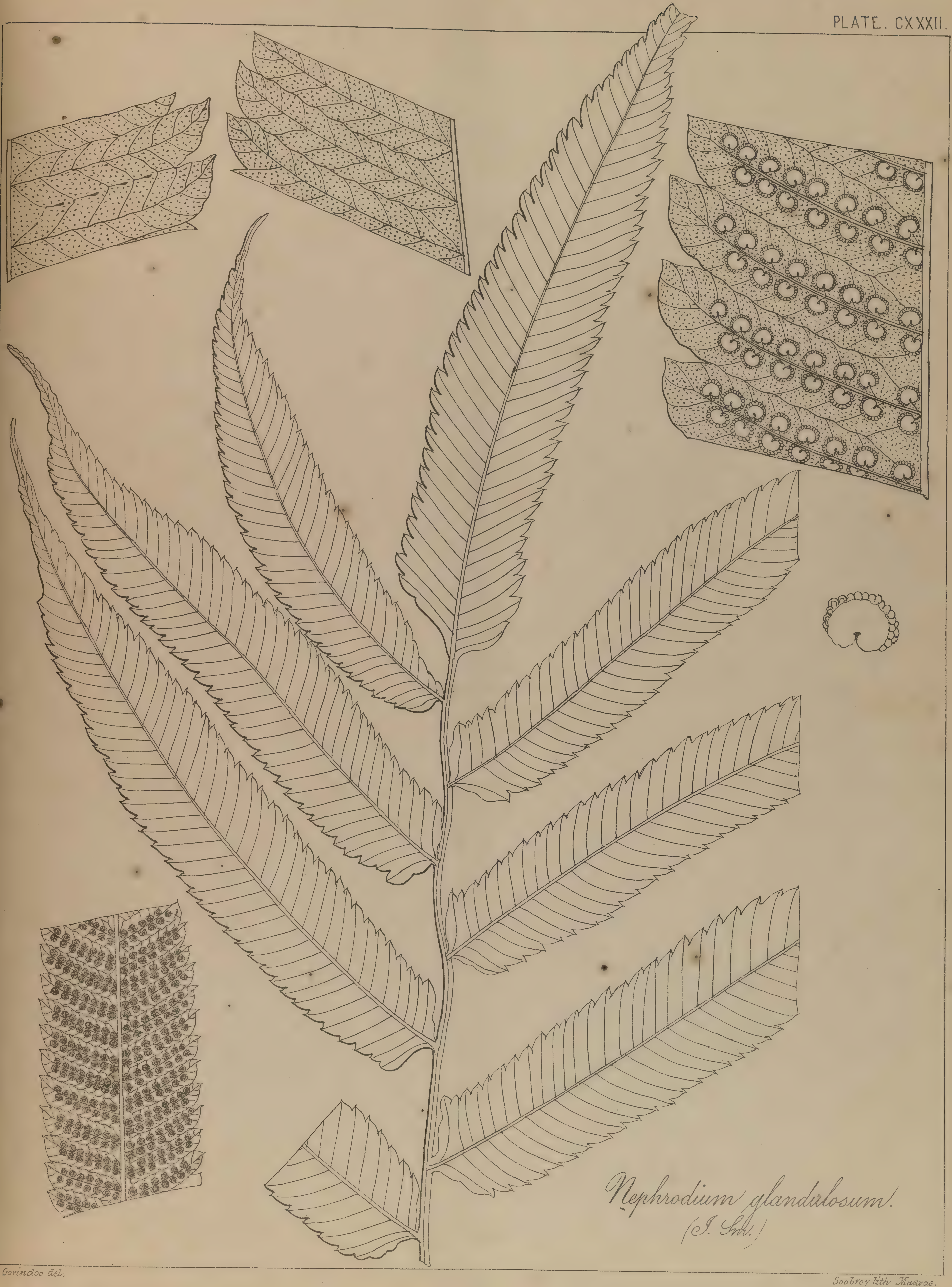
NEPHRODIUM.

NEPHRODIUM GLANDULOSUM. (J. Sm.) Fronds coriaceo-membranaceous pinnate, glabrous on both sides, pinnæ alternate sessile from a broad truncated base about 6 inches long and an inch to an inch and a quarter broad, gradually and rather long acuminated, covered with small glandular tubercles on both sides, coarsely lobato-serrate, serratures falcate acute, veins 9-10 pair generally all anastomosing (except the 2-3 upper pair in the serratures), and the excurrent veinlets joined throughout and forming a very prominent flexuose pseudo costule, the lower pair of veins or one of them is sometimes free, and the excurrent veinlet is also sometimes free in 1 to 4 of the lower areoles, sori large situated a little below the middle of each vein, indusium very apparent reniform ;—Nephrodium ;—*J. Sm. in Hook. Journ. of Bot., p.* 411 ;—Aspidium ;—*Bl. En. Fil. Jav., p.* 144 ? *Hook. Sp. Fil.* iv. 76.

The specimen figured is from the Himalayas, (Mr. Oldham). I am not quite sure whether I have rightly named this and the following species, several species of the genus Nephrodium are very closely allied to each other, and it is impossible to say that intermediate forms do not exist ; both these species are closely allied to N. abruptum *Presl.*, the specimens here figured have the fertile and sterile fronds exactly similar, and Sir W. Hooker describes the N. glandulosum. *J. Sm.* and lineatum *Presl.* as having the fronds dimorphous, or subdimorphous. I do not, however, attach any importance to this fact, as I have often found N. abruptum with the fronds dimorphous, or with broad sterile pinnæ and contracted fertile pinnæ on the same frond, or with both sterile and ertile pinnæ exactly similar, and I have constantly observed the same tendency in many other genera with dimorphous fronds, (Gymnopteris Pœcilopteris, Meniscium, &c.)

Hab. Himalayas, Assam, Java, Island of Leyte.

PLATE No. CXXXII.



Govindoo del.

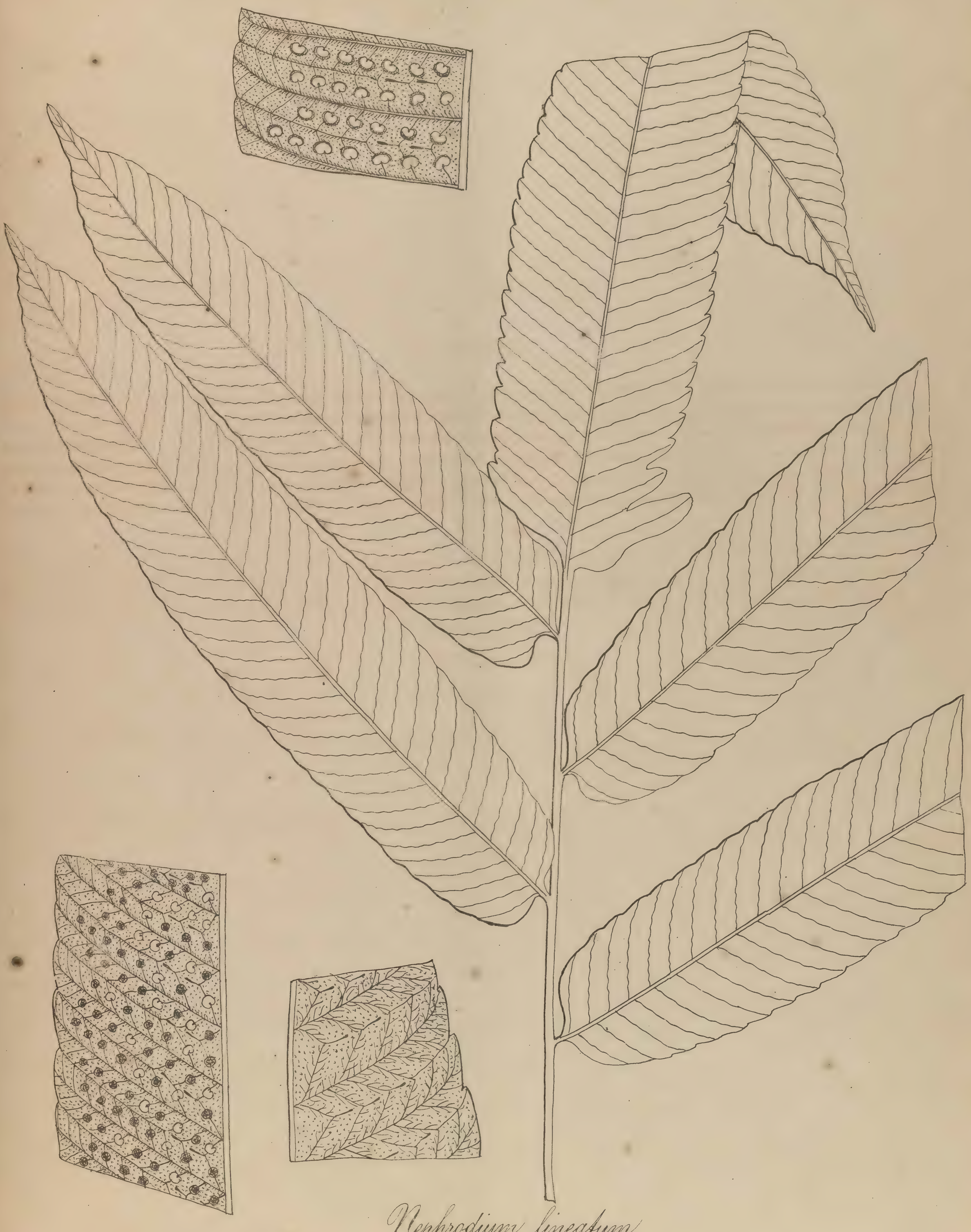
Soobroy lith Madras.

NEPHRODIUM.

NEPHRODIUM LINEATUM. (Presl.) Fronds ovate pinnate, veins on the upper side furnished with a few distant longish hairs, on the under side slightly pubescent or subglabrous, pinnæ alternate sessile or subpetiolate, 5 to 7 inches long by 1 to 1½ broad, shortly and rather suddenly acuminated, covered with minute glandular tubercles on both sides, sub-entire or more or less repando-serrate, terminal pinnæ often lobed towards the base, veins 8 or 10 pair all or all but the upper pair anastomosing and at their junction excurrent, the excurrent veinlet being generally free in the lowest pair, but forming a continuous pseudo costule in all the others, sori small about the middle of each vein, indusium apparent reniform. Nephrodium, *Presl. Epimel. Bot. p.* 48. *Hook. Sp. Fil.* iv. 74 ;—Aspidium obscurum ? *Bl. En. Fil. p.* 150 ?

The specimen figured is from Nynee Tal, (Mr. Oldham). It is almost exactly similar to *Goniopteris urophylla.* (Pl. CCXXXIX) of the " Ferns of Southern India," except that it is always indusioid ; as Sir W. Hooker observes, it is very startling how some ferns of the *Aspidioid* group exactly resemble others of the tribe *Polypodiæ,* the presence or absence of the indusium being almost the only distinction.

PLATE No. CXXXIII.



Nephrodium lineatum.
(Presl.)

Govindoo del.

Scobroy lith. Madras.

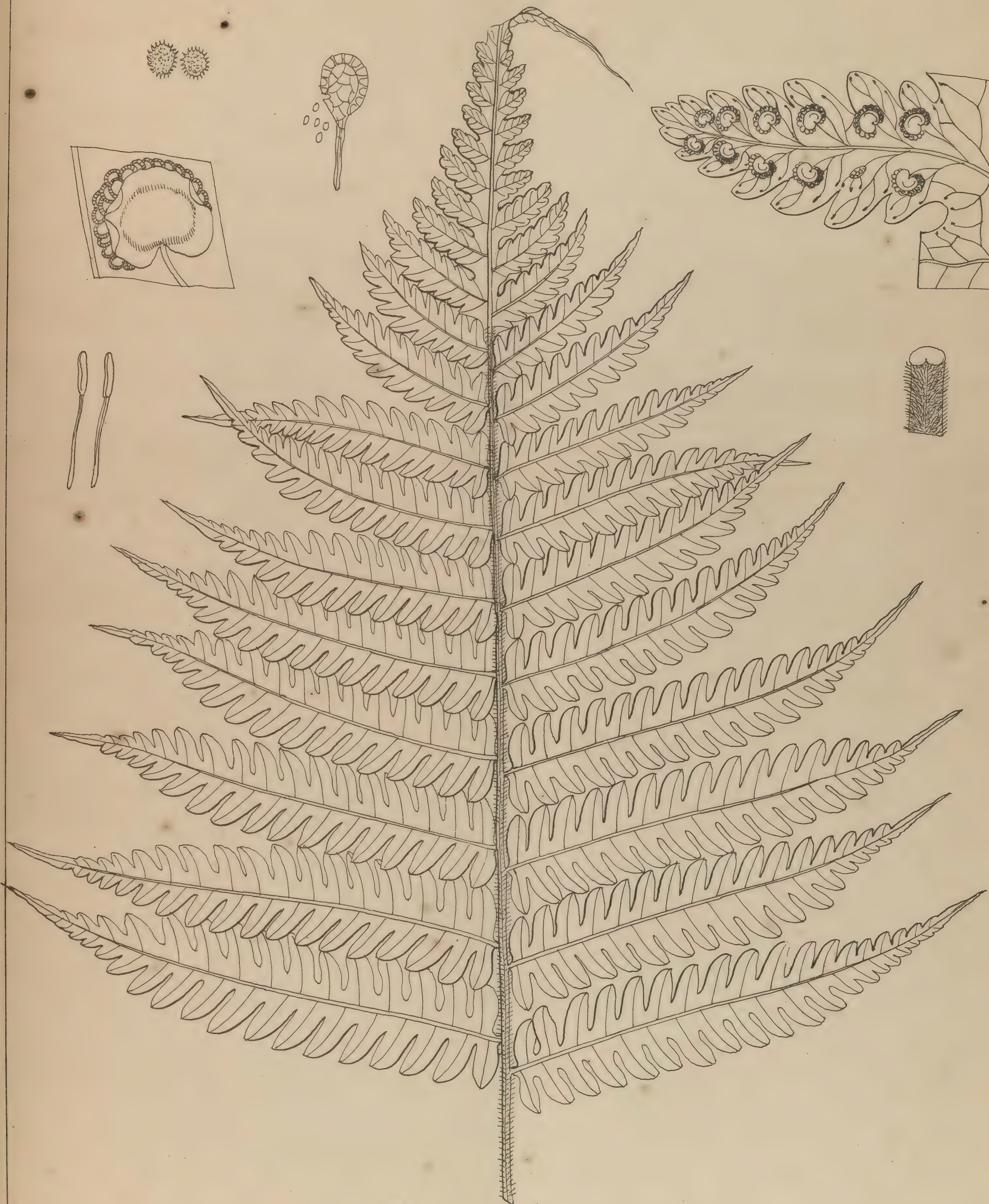
PLEOCNEMIA. (See " Ferns of Southern India," p. 28.)

PLEOCNEMIA LEUZEANA. (Kze). Stipes 1½ foot long, stout angular crinite at the base with very long subulate flexuose silky scales, fronds large, ample submembranaceous tripinnate, primary pinnæ a foot and more long, ovate acuminate petiolate, pinnules 3-4 inches long, petiolulate from a broad subcordate base, oblong deeply (more than half way down) pinnatifid, ending in a rather long entire acumen, fertile ones often contracted, segments oblong obtuse subfalcate entire crenato-serrate, the basal ones rarely sub-lobato-pinnatifid, veins uniting and forming elongated areoles near the costa, in the sterile more or less united and reticulated at a distance from the costa, sori copious, more or less remote from the margins, involucres orbiculari-cordate readily deciduous. *Hook. Sp. Fil.* iv. 61 ;—Aspidium Leuzeanum, *Kze. Bot. Zeit.* 14-474. *Metten. Fil. Hort. Lips., p.* 94, *t.* 22, *f.* 8-9 ;—Pleocnemia, *Pr. Tent. Pterid., p.* 183. *Epimel. Plant., p.* 50. *Hook. Gen. Fil. t.* 70-*A. (involucres omitted)* and *t.* 97. *J. Sm. in Hook. Journ. Bot.* iii., *p.* 411. *Brock. Fil. U. S. Expl. Exp. p.* 183 ;—Polypodium *Gaud. in Freyc. Voy., p.* 371. *t.* 6 ;—Pleocnemia Cumingrona *(fertile portions of the frond more contracted.) Pr. Epimel. Bot., p.* 50 ;—Aspidium conjugatum, *Bl. En. Fil. Jav., p.* 169 ;—Pleocnemia conjug., *Pr. Epimel. Bot. p.* 259, *and* P. Javanica, *p.* 50.

The specimen figured is from Birmah—(Parish.)

Hab. Moluccas, Java, Ceram, Luzon, China, Mishmee and Assam, Sylhet, Birmah, Samoan, and Feejee Islands.

PLATE No. CXXXIV.



Pleocnemia Leuzeana.
(Presl.)

Govindoo del.

Soobroy Lith. Madras.

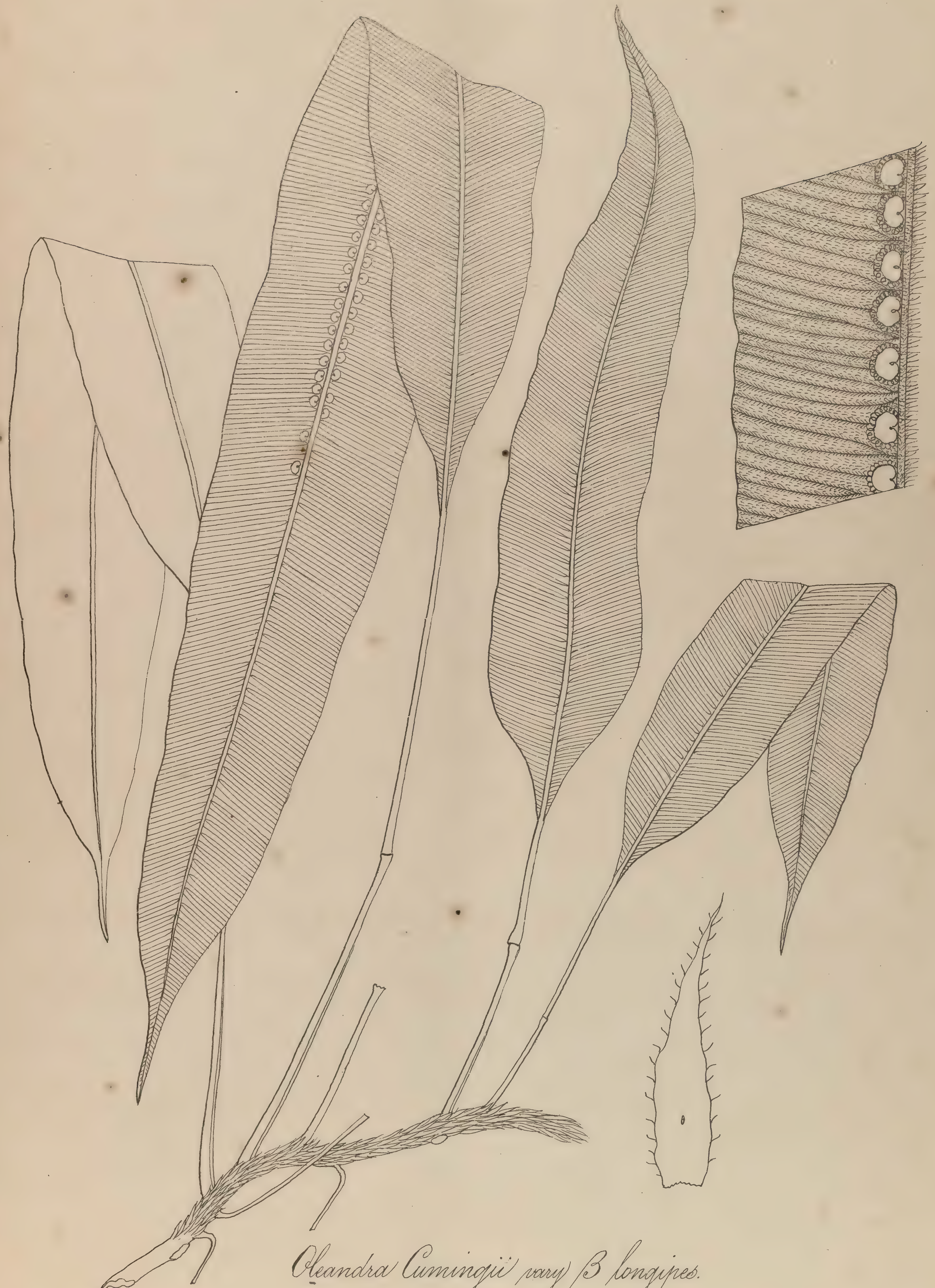
OLEANDRA. (See "Ferns of Southern India," p. 32).

OLEANDRA CUMINGII. (J. Sm.) Caudex apparently creeping, scarcely so thick as a writing pen, clothed with close pressed subulate imbricated scales, stipites subterminal and subaggregated 2-3 inches long, slightly downy, articulated within $\frac{1}{2}$-$\frac{3}{4}$ of an inch from the base, fronds 1-1$\frac{1}{2}$ foot long, firm membranaceous, elongato-lanceolate acuminate very much attenuated and gradually decurrent at the base, pubescenti-villous on the costa and veins, sori rather large, forming a single and scarcely interrupted line very near to and on each side the costa. *Hook. Sp. Fil.* iv. 158. *J. Sm. in Hook. Journ. Bot.* iii., *p.* 413. (*name only.*) *Pr. Epimel. Bot. p.* 41.——*var. β. longipes;* —stipes 4-6 inches long, inferior articulation 1-2$\frac{1}{4}$ inches long, fronds less attenuated at the base, sori quite costal, in one instance irregularly scattered at a distance from the costa.

The specimen figured is from Birmah—(Parish.)

Hab. Luzon, Birmah, Assam.

PLATE No. CXXXV.



Oleandra Cumingii var. β longipes.
(J. Sm.)

Govindoo del.

Soobroy lith Madras.

POLYSTICHUM. (See "Ferns of Southern India," p. 41.)

POLYSTICHUM AURICULATUM. (VAR.) SUBBIPINNATUM. (Hook.) Pinnæ subcoriaceous, variously and deeply lobed and toothed, below frequently again pinnated, the lobes and pinnules spinulose (thus bordering on aculeatum var. lobatum.)—*Hook. Sp. Fil.* iv. *p.* 11; Aspidium ocellatum.—*Wall. Cat. n.* 98;—A. lentum, *Don. Syn. Nep. p.* 4.

The specimen figured is from the Khasya Hills, (Dr. Thomson) though differing considerably from the normal state of P. auriculatum (Pl. CXX. of the Ferns of Southern India) Sir W. Hooker only considered it a variety of that species.

Hab. Nepaul, Kumaon (elevation 2,600 feet,) Khasya, Harabagh.

PLATE No. CXXXVI.

Polystichum auriculatum.
var. bipinnatum. (Hook.)

Govindoo, del. A. Barren, del. & lith: Madras. 1866.

SAGENIA. (See "Ferns of Southern India," p. 27.)

SAGENIA SEMIBIPINNATA (Hook.) Caudex creeping scaly, stipites a span to a foot high striated with prominent angles, reddish-brown as well as the rachis and costæ, fronds 1-1½ foot long, oblong-ovate in circumscription coriaceo-membranaceous, dark brown when dry, glabrous sub-bi-tripinnate, pinnæ 9-11 6-10 inches long, linear-lanceolate subflexuose acuminate tapering at the base, quite entire, strongly costate, the lowest pair or two pairs long-petiolate tripartite or 3-foliate, sometimes again divided so as to be twice trifoliate, primary veins sub-horizontal united by arches with the margin, the rest variously anastomosing, the areoles appendiculate, sori (only young and imperfect) compital, involucre subreniform.—*Hook. Sp. Fil.* iv. *p.* 59. Polypodium semi-bipinnatum.—*Wall. Cat. n.* 388 *and* 2,229.

The figure is taken from Sir W. Hooker's Sp. Fil.

Hab. Penang, Borneo.

PLATE No. CXXXVII.

Sagenia semibipinnatum.
(Hook.)

Govindoo del.

A. Barren, del. & lith. Madras. 1866.

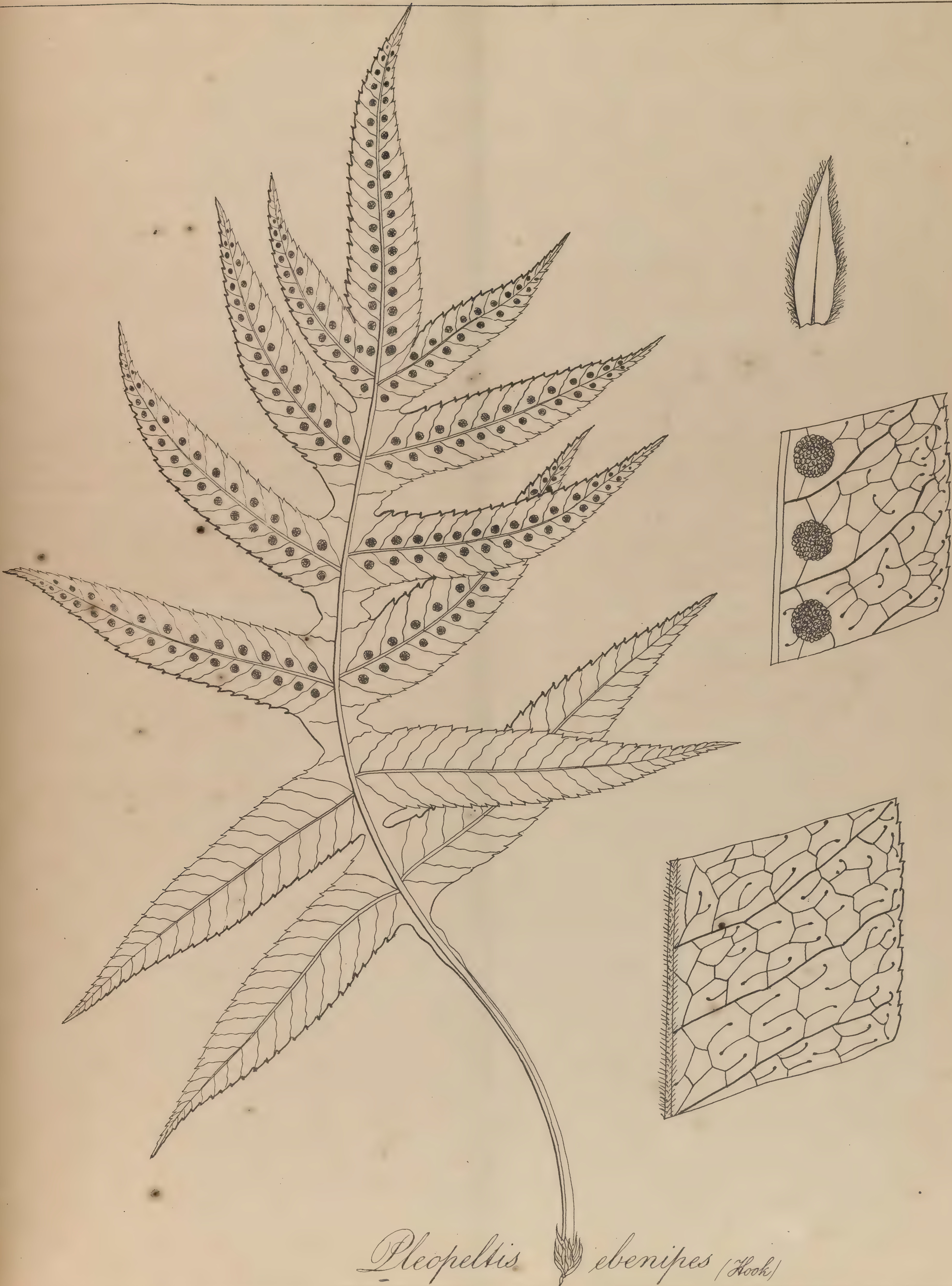
PLEOPELTIS. (See "Ferns of Southern India," p. 57.)

PLEOPELTIS EBENIPES. (Hook.) Caudex stout creeping elongated and knotted with short frondiferous branches, every where densely imbricated with intensely-black polished ovato-lanceolate subcoriaceous concave scales fusco-pubescent at the margin, stipites stramineous 6 inches to a span long, fronds a span to 1½ foot long broad-ovate or deltoid cordate at the base, acuminated (by the long terminal segment) coriaceo-membranaceous subrufescent when dry, minutely and compactly pellucido-punctate deeply pinnatifid with acute or obtuse sinuses, segments 4-5 inches long, ¾-1 inch wide, very patent from a broad base oblong-lanceolate sharply acuminate, closely serrated, lowest pair generally opposite and drawn in as it were at the very base so as to form a more or less deep sinus at the summit of the stipes, venation very manifest, costules distinct parallel moderately distant extending to the margin, these are united by transverse veins forming about 3-4 series of areoles including free and connected veinlets of which the second only are soriferous, sori very large orbicular in a single series very near the costa.—*Hook. Sp. Fil.* iv. *p.* 88. Polypodium melanopus.—*Br. in Wall. Cat. n.* 293 *in part (v. Cat. n.* 293 *at p.* 83, *not P. melanopus Hook. and Grev.)*

The specimen figured is from Sikkim, (Dr. Thomson.)

Hab. Nepaul (10,000 feet elevation), N. W. Himalaya (8—9,000 feet elevation), Sikkim (8,000 feet.)

PLATE No. CXXXVIII.



Pleopeltis ebenipes (Hook)

Govindoo, del^t.

A. Barren; Lithog^r. Madras, 1866

§ 10—*Menisciecæ.*

(b.) *Veins arcuately anastomosing, forming costal areoles; venules free.*

BRAINEA. *J. Smith Catalogue of Kew. Ferns*, 1856, v.

(Bowringia, *Hook. non Champion.*)

Gen. char. *Sori* non-indusiate, short, transverse, curved; the *receptacles* seated on the arcuate costal veins, and often extending more or less up the parallel oblique free venules; at length irregularly confluent. *Veins* arcuately anastomosing at the base, forming costal areoles; *venules* simple or forked, parallel, connivent with the thickened margin;

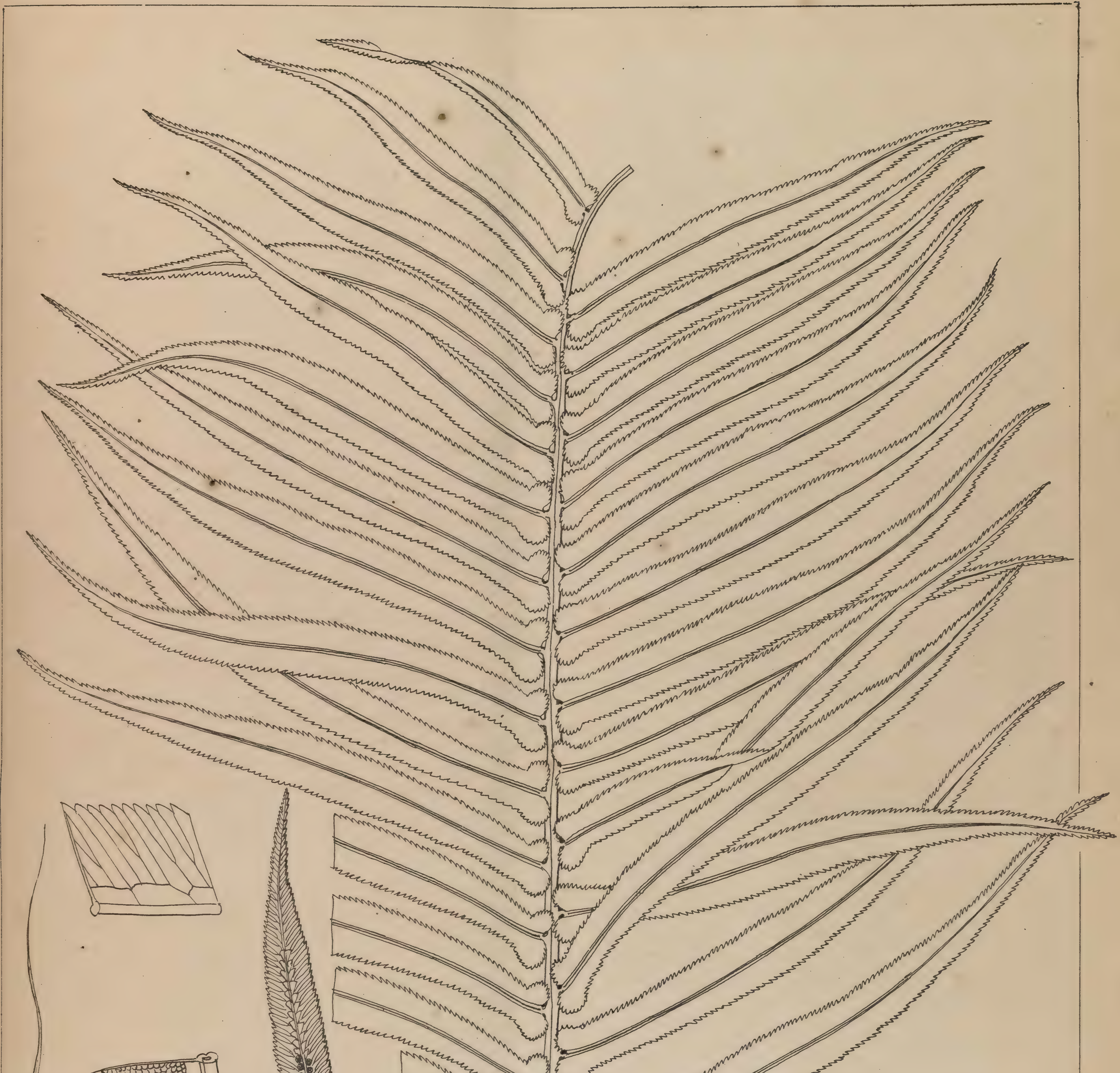
Fronds rigid coriaceous pinnate, becoming pinnato-pinnatifid. Rhizome arborescent 3-4 feet high. (*Moore.*)

BRAINEA INSIGNIS. (Hook.) Caudex arborescent as thick as a man's arm clothed with shaggy dark-brown or ferruginous long subulato-lanceolate scales, stipites stout, short, scarcely a span long: fronds not unlike a Lomaria firm coriaceous, bright-green, pinnated or below bipinnated, pinnæ very close placed, horizontal 5-6 inches long, 4 lines broad, from a cordate base, linear-oblong, gradually and finely acuminated, minutely serrated.—*Hook. Sp. Fil.* v. 162. Bowringia, *Hook. Kew, Gard. Misc.* v. *p.* 23 *t.* 2.—*Hook. Fil. Exot. t.* 38.

The specimen figured is from Burmah, (the Pine Forests,) [Parish.]

Hab. Hongkong, Eastern Bengal, Khasya (elevation 4,000 feet.), Burmah.

PLATE No. CXXXIX.



Brainea insignia (J. Sm)

Covindoo. del^t. A. Barren, Lithog. Madras 1866.

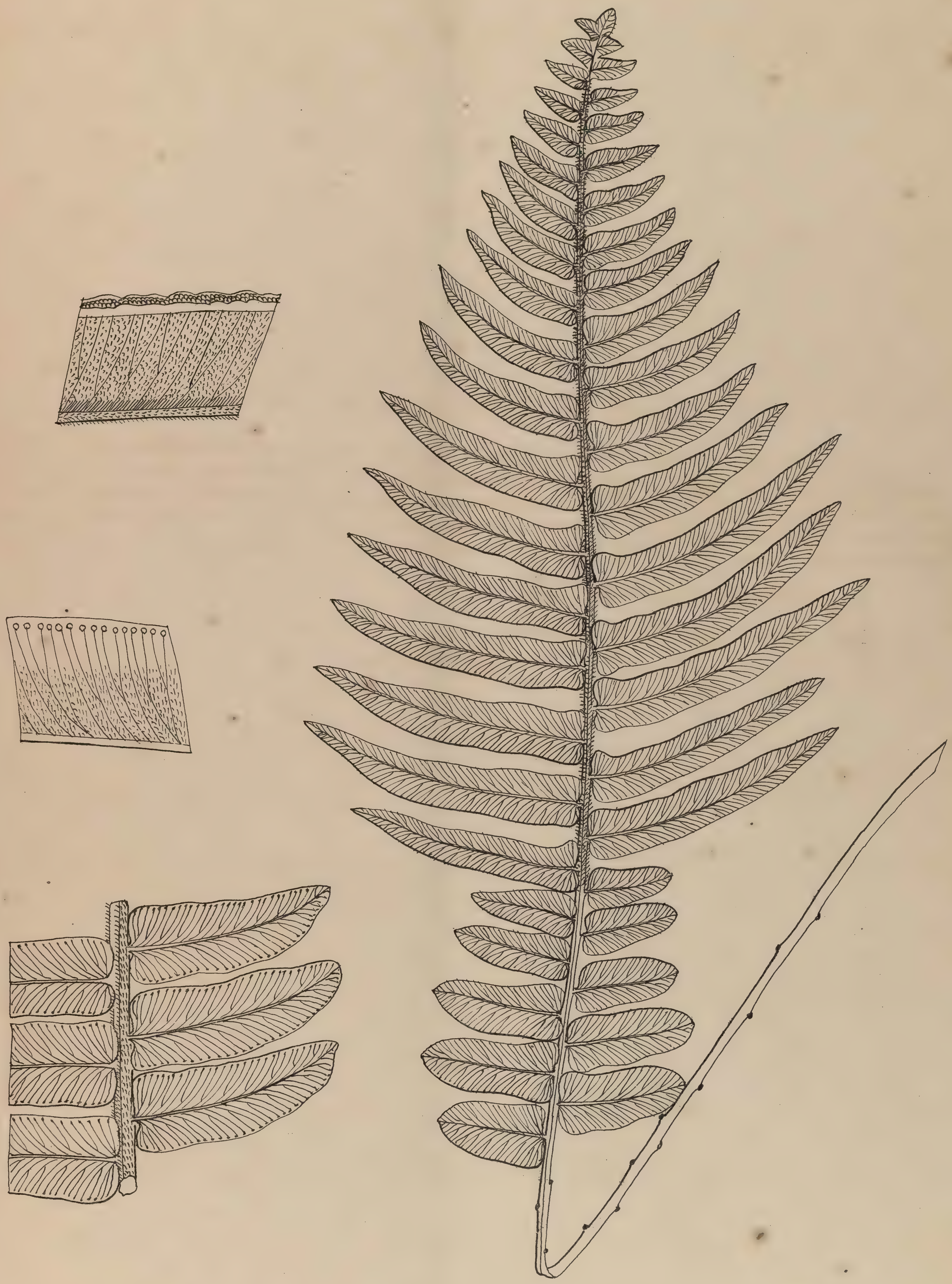
LINDSÆA. (See "Ferns of Southern India," p. 7.)

LINDSÆA LANUGINOSA. (J. Sm.) Caudex tall robust, fronds up to 3 feet long, oblong-lanceolate pinnated, pinnæ subcoriaceous approximate very numerous oblong approaching to lanceolate more or less falcato-incurved obtuse or acute, deciduous, the sides equal, the base truncate sessile, below clothed with deciduous wool, costa central, veins spreading copious, in old fronds terminating on the upper side in white cretaceous dots just within the margin, sorus on both sides and at the margin continuous, stipes short and rachis (stout) more or less woolly.—*Hook. Sp. Fil.* i. *p.* 210. ; *Wall. Cat. n.* 154. Isoloma, *J. Sm.*

The specimen figured is from Burmah, (Parish.)

Hab. Singapore, Penang, New Guinea, Burmah.

PLATE No. CXL.



Lindsæa lanuginosa (Wall)

Govindoo del:

A. Barren, lith: Madras.

SCHIZOLOMA. (See "Ferns of Southern India," p. 9.)

SCHIZOLOMA DAVALLIOIDES. (Bl.) Caudex creeping, stipes and rachis long tetragonous glabrous, stipites tufted, frond subdeltoid-ovate bipinnate, pinnæ erecto-patent lanceolate acuminate, pinnules dimidiato-oblique membranaceous reticulated (reticulations few), the apex obtuse, superior base truncate, costa at the inferior margin, superior margin rather deeply but irregularly lobed, sori interrupted linear confined to the apices of the lobes.—*Hook. Sp. Fil.* i. 224 ; *Bl. Fil. Jav. p.* 218. Lindsæa lobata, *Wall. Cat. n.* 152. Davallia Kunziana.—*Hook. Sp. Fil.* i. 177.

The figure is taken from Sir W. Hooker's Sp. Fil.

Hab. Singapore, Java, Malacca.

PLATE No. CXLI.

Schizoloma davallioides.
(Bl.)

Covindoo del.   A. Barren, lith: Madras.

CHEILANTHES. (See "Ferns of Southern India," p. 63.)

CHEILANTHES SUBVILLOSA. (Hook.) Stipes shining brown slightly scaly, frond broad-lanceolate or ovate pinnate, thin sub-membranaceous glabrous above, soft villous about the rachises beneath, pinnæ all obtuse, upper ones lanceolate, the rest broad deltoid-lanceolate or ovate pinnatifid, rarely the lowest laciniæ again pinnatifid, the margin nearly entire, involucres of nearly the same color and texture as the frond, sometimes subrotund and free, mostly continuous, lobed and crenated, main rachis especially above villous. *Hook. Sp. Fil.* i. *p.* 87.

The figure is taken from Sir W. Hooker's Sp. Fil.

Hab. Western Himalaya.

PLATE No. CXLII.

Cheilanthes subvillosa. (Hook.)

Govindoo, del. A. Barren. lith. Madras.

CHEILANTHES.

CHEILANTHES ARGENTEA. (Hook.) Glabrous glossy brown, a little scaly below, caudex short, thick, creeping, stipites tufted, frond cordately 5 angled tripartite white and pulverulent beneath, each of the three primary divisions pinnatifid, at their base bipinnatifid, the margin crenated, involucres membranaceous brown confluent transversely waved and crenated.—*Hook. Sp. Fil.* 1 *p.* 76. Pteris argentea, *Gmel. in Nova. Acta. Petrop.* xii. *t.* 12 *f.* 2; Allosorus, *Presl.*; Cassebeera, *J. Sm.*;—Pteris pedata, var. *Linn.*

The specimen figured is from Burmah, (Parish.)

Hab. Burmah, Siberia, Kamtschatka, Dahuria, Lake Baikal.

PLATE No. CXLIII.

Cheilanthes argentea
(Hook.)

Govindoo del:

A. Barren lith Madras.

CHEILANTHES.

CHEILANTHES RUFA. (Don.) Roots tufted, stipites rather short with few spreading scales and shaggy as is the whole rachis with very copious spreading ferruginous hairs, fronds about a span long ovato-lanceolate subcoriaceous hirsuto-pubescent above, white and pulverulent beneath, the margin densely ferrugineo-hirsute, pinnate, pinnatifid at the apex, pinnæ oblong very obtuse pinnatifid, the lower ones subovate sub-bipinnatifid, involucres dark-brown membranaceous approximate and free or continuous and waved and crisped or lobed and toothed at the margin, often quite concealed by the copious ferruginous tomentose shaggy hairs.—*Hook. Sp. Fil.* i. *p.* 79 ;—*Don. Prod. Fl. Nop. p.* 18. Cheilanthes farinosa *var.* vestita.—*Wall. Cat. n.* 71 (4.)

The specimen figured is from Burmah, (Parish.)

Hab. Nepaul, Mergui, Mishmee, Burmah, Khasya, Simla.

PLATE No. CXLIV.

Cheilanthes rufa. (Don.)

Covindoo. del. A. Barren. lith. Madras.

CHEILANTHES.

CHEILANTHES SZOVITZII. (Fisch. et Mey.) Roots densely tufted from a short thick caudex, stipites crowded 2-4 inches long, slender and as well as the principal rachises ebeneous somewhat hairy mixed with copious long spreading subulate scales, fronds 3-4 inches long oblong-lanceolate, quite glabrous above, densely woolly and generally tawny beneath, tri-subquadripinnate, primary pinnæ ovate acuminate approximate or distant, pinnules small subrotund or subcordate, sublobate, terminal ones often larger and oblong, the margin revolute forming nearly a continuous involucre, the edges obscurely membranaceous.—*Hook. Sp. Fil.* i. *p.* 98*; Fisch. et Mey. in Hohenacker En. Pl. Prov. Talysch., p.* 11.

The figure is taken from Sir W. Hooker's Sp. Fil.

Hab. Caucasian Alps, Affghanistan, Peshawur, Indus Valley (7,500 feet elevation), Kashmir, and Western Thibet (8,500 feet elevation), Scinde.

PLATE No. CXLV.

Cheilanthes Szovitzii.
(Fisch: et Mey.)

Govindoo del:

A. Barren lith: Madras.

ASPLENIUM. (See "Ferns of Southern India," p. 42.)

ASPLENIUM FONTANUM. (Bernh.) Caudex short thick tuberous densely rooting, stipites 1-3 inches in length slender, pale brownish-green densely tufted, fronds 3-6 inches long linear or broad-lanceolate attenuated below, membranaceous, bright green, bipinnate, pinnæ approximate $\frac{1}{4}$ to $\frac{1}{2}$ an inch long, patent or sometimes reflexed, sessile, ovate obtuse, lowest ones dwarfed tripartite, pinnules obovate or cuneate minute $\frac{1}{2}$ a line to a line long the base entire, the rest coarsely and spinuloso-dentate, sori few on each pinnule or lobe at length confluent, involucres very small, athyroid white thin membranaceous.—*Hook. Sp. Fil.* iii. *p.* 193 ;—*Bernhard in Schrad, Neu. Journ.* 1806 i. *part* 2, *p.* 26 ;—*Sw. Syn. Fil. p.* 57 ;—*Willd. Sp. Pl.* v. *p.* 272 ;—*Engl. Bot. t.* 2,024 ;—*Mett. Aspl. p.* 140 ; Athyrium *Roth.* ;—Asplenium Halleri. *Willd. Sp. Pl.* v. *p.* 274.

The specimen figured is from the Himalayas, (Dr. Stewart.)

Hab. Europe, Britain, Himalayas.

PLATE No. CXLVI.

Asplenium fontanum.

(Bernh)

Govindoo, del.

A. Barren, Lithog: Madras, 1866.

ASPLENIUM.

ASPLENIUM STENOPHYLLUM. (Bedd.) Caudex creeping, densely clothed with linear acuminate black smooth scales, fronds subcoriaceous, narrow-linear acuminate, 15-18 inches long, $\frac{1}{4}$ to $\frac{3}{8}$th of an inch broad perfectly glabrous gradually attenuated into a short stipes which is more or less furnished with scales similar to those on the caudex, costa prominent sulcate, veins sunken inconspicuous, once forked, terminating within the margin ; sori linear on the superior veinlet neither reaching to the costa nor extending to the margin ; involucres conspicuous.

Allied to A. ensiforme (Wall.) but with very narrow fronds like a Vittaria.

The specimen figured is from Rungro, Sikkim (elevation 6,000 feet), (Dr. Anderson.)

Hab. Sikkim—Himalaya.

PLATE No. CXLVII.

Asplenium stenophyllum.
(Bedd.)

Govindoo del:

A. Barren lith Madras.

GRAMMITIS. (See "Ferns of Southern India," p. 17.)

GRAMMITIS MICROPHYLLA. (Hook.) Caudex very slender filiform subrepent and intertwined so as to form a collection of tufted wiry fibres, stipites copious slender filiform very fragile dark-purple ebeneous glossy 2-4 inches long, fronds membranaceous sub-diaphanous 1½-2½ inches long glabrous triangulari-ovate 3-pinnate (or pinnate and 2-3 pinnatifid) lowest primary pinnæ half-ovate the rest oblong, ultimate pinnules (or segments) oval-lanceolate entire acute decurrent upon the rachises which thus become winged, veins dichotomous one in each pinnule or segment oblong not forked, veinlets terminating below the apex.—*Hook. Sp. Fil.* v. *p.* 129; *Ic. Pl. t.* 1916; *Cent. of Ferns t.* 16.

The specimen figured is from the Khasya Hills.

Hab. Khasya Hills.

PLATE No. CXLVIII.

PLATE. CXLVIII.

Grammitis microphylla.
(Hook.)

Govindoo del:

A. Barren lith. Madras.

§13. GYMNOGRAMMEÆ.

(c.) *Veins connivently anastomising below.*

STEGNOGRAMMA. *Bl. En. Fil. Java.* 172.

(Syneuron, J. Sm. M. S.—Gymnogrammitis, Sp. Bl.—Phegopteridis, Sp. Mettenius.)

Gen. char. *Sori* non-indusiate, linear or oblong, oblique, parallel; the *receptacles* simple elongated and medial. *Veins* simple from a central costa; the lower or more opposite pairs angularly connivent-anastomising.

Fronds herbaceous pinnate or pinnato-pinnatifid. Rhizome thickish decumbent or erect and sub-arborescent. This is amongst Gymnogrammeæ what Nephrodium is amongst Aspidieæ and Goniopteris among Polypodieæ. (Moore.)

STEGNOGRAMMA ASPIDIOIDES. (Bl.) Caudex ascending more or less paleaceous-subrepent, *whole* plant on both sides especially on the veins hairy (except the caudex) sometimes densely villous, stipites terminal on the caudex tufted a span to a foot long at length glabrous glossy, fronds 1-1½ foot long 5-6 inches wide ovate-lanceolate acuminate pinnated, pinnatifid at the apex, firm-membranaceous, pinnæ opposite or alternate sessile subtruncate or more or less adnate at the base 3-4 inches long rarely an inch wide oblongo-lanceolate lobato-pinnatifid, superior ones confluent, veins 5-6 pairs from each costule simple 3 lower ones united to those opposite and forming an excurrent spurious vein reaching to the sinus, those in the lobes free, all soriferous, sori linear-oblong occupying nearly the whole length of the veins.—*Hook. Sp. Fil.* v. 150.—*Bl. En. Fil. Jav. p.* 172, (*not Fil. Jav. p.* 112, *which is* Gymnogrammæ totta) Gymnogramme Stegnogramme, *Bl. Fil. Jav. p.* 98 *t.* 44. Phegopteris Stegnogramme, *Metten. Fil. Hort. Lips. p.* 84.

The specimen figured is from Khasya, (Dr. Thomson.)

Hab. Java, (3-4,000 feet elevation), Khasya (6,000 feet elevation), Ceylon, (vide p. 78 "Ferns of Southern India and Ceylon.")

PLATE No. CXLIX.

Stegnogramma aspidioides. (Bl.)

Govindoo. del.

A. Barren. Lithog. Madras 1866.

§ 13, GYMNOGRAMMEÆ.

(d.) Veins pinnate: venules reticulated with free included veinlets.

SELLIGUCA. *Bory. Dict. Class. d'Hist. Nat.* vi. 587.

(Diagramma, *Blume*;—Colysis *Presl.*;—Dictyogramma *Presl.*;—Grammitidis Sp. *Auct.*; Gymnogrammatis Sp. *Auct*;—Hemionitidis Sp. *Auct.*;—Polypodii Sp. *Auct.*;—Ceterachis Sp. *Auct.*)

Gen. char. *Sori* non-indusiate, oblong or linear, oblique; the elongate *receptacles* lying between and parallel with the primary veins. *Veins* pinnate or sub-pinnate from a central costa; *Venules* compoundly anastomosing, producing within the areoles variously directed free curved *veinlets*.

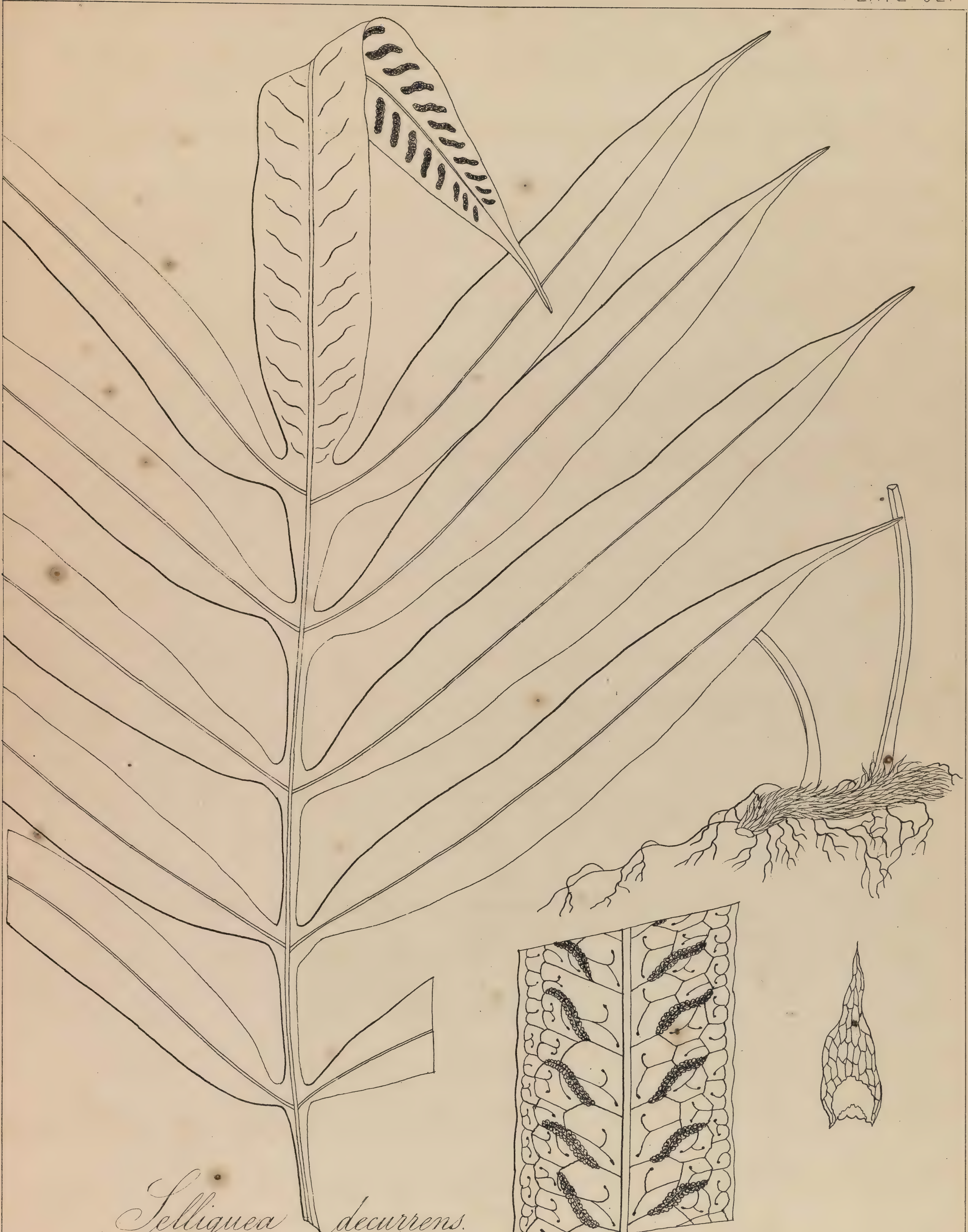
Fronds simple, pinnatifid or palmately-lobed, herbaceous or coriaceous. Rhizome creeping. (Moore.)

SELLIGUEA DECURRENS. (Hook.) Caudex creeping paleaceous, stipites distant 1 foot and more long stramineous-brown, fronds 1-1½ foot and more long 8-10 inches broad firm-membranaceous, broad-ovate, deeply pinnatifid or pinnated with the rachis more or less winged, segments spreading 6-8 inches long ½ an inch or less to 1½ inch wide linear-lanceolate or broad oblongo-lanceolate finely acuminate subopposite and very distant, generally contracted near the base then dilated above, and so extending above and decurrent below as to form a narrow or broad wing between the segments, veins sometimes slightly costuliform but usually they constitute rather large unequally-sized hexagonal areoles including free clubbed veinlets, sori linear obliquely patent varying much in length and in breadth, commencing near the costa but never extending to the margin.—*Hook. Sp. Fil.* v. *p.* 161;—Grammitis decurrens, *Wall. Cat. n.*, 5.—Hemionitis pothifolia, *Don. Prod. Nep. p.* 13;—Colysis *Pr. Epim. Bot. p.* 148;—Polypodium, *Mett. Poly. p.* 103.

The specimen figured is from Moulmein—(Parish.)

Hab. Nepaul, and all along the Himalayas from N. W. Bengal to Sikkim, Bhotan, Khasya (6,000 feet elevaton), Moulmein, Luzon, China, Loochoo, Hong-Kong, Formosa, Japan, Nagasaki.

PLATE No. CL.



Selliguea decurrens. (Hook.)

Govindoo. del.

A. Barren: Lithog. Madras, 1866.

SELLIGUEA.

Selliguea Feei. (Bory.) Caudex creeping paleaceous with subulato-setaceous scales which are dilated at the base stipites distant 2-4 or 6 inches long (of the fertile fronds) fronds more or less firm-coriaceous glabrous ; sterile ones 2-4-5 inches long, ovate acuminate with an obtusely cuneate base rarely and only when young oblongo-ovate and obtuse ; fertile ones 4-6 inches long lanceolate acuminate (rarely oblong and obtuse) sub-decurrently attenuated at the base, costules very prominent especially in the fertile fronds, veins obscure, in the sterile fronds forming a net work of irregular areoles in which are included free clavate simple or forked veinlets, in the fertile fronds less compound and veinlets not forked, sori central between, and parallel with the costules, sunk, when young, small and suborbicular, in maturity nearly as long as the costules linear-oblong pulvinate rarely subinterrupted.—*Hook. Sp. Fil.* v. 158 ; *Bl. Fil. Jav. p.* 123 *t.* 51 ; *Bory. in Dict. Class d'Hist. Nat.* vi. *p.* 344 ;—Polypodium Vulcanicum ; *Bl. l. c. p.* 144*t.* 56. *Fig.* 2 ;—Grammitis diversifolia. *Wall. Cat. n.* 8.

The Specimen figured is from the Calcutta Herbarium.

Hab. Penang, Singapore, Java, Borneo.

PLATE No. CLI.

Selliguea Feei.
(Bory).

Govindoo, del: A. Barren Lith: Madras.

GRAMMITIS. (See "Ferns of Southern India," p. 17.)

GRAMMITIS AURITA. (Hook.) Caudex creeping elongated paleaceous, stipites a span to a foot long, dark, castaneous glossy, fronds 1½-2 feet long firm membranaceous ovato-oblong acuminate pinnate rarely sub-bipinnate, pinnæ mostly opposite in distant pairs approximate (confluent at the apex) 4-8 and more inches long, ½-1 inch wide from a broad sessile base (1½-2 inches wide) oblong gradually acuminated deeply pinnatifid, lobes broader at the base oblongo-acuminate crenato-serrate the lowest pair twice longer and larger, especially the inferior one and sub-pinnatifid, veins simple or forked all soriferous, sori oblong simple rather nearer the margin than the costule.—*Hook. Ic. Pl. t.* 974, *or* 74, *Cent. of Ferns. Sp. Fil.* v. *p.* 141.—Phegopteris of *J. Sm.*

The specimen figured is from the Khasya Hills, (Blandford.)

Hab. Khasya, Mumbree and Muncklow, Lachen, (alt. 6,000 feet.)

PLATE No. CLII.

Govindoo, del.

A. Barren, lith. Madras.

§12. HEMIONITIDEÆ.

(b.) Primary veins parallel forked, venules sparingly reticulated towards the margin.

SYNGRAMMA. *J. Sm. Hook. Lond. Jour. Bot.* iv. 168, *t.* 7. 8.

(Callogramma. *Fée.* ;—Gymnogrammatis *Sp. Auct* ;—Diplazii *Sp. Presl.* ;—Oxygonii *Sp. Auct.* ;—Callipteridis *Sp. J. Sm.* ;—Grammitidis, *Sp. Wallich.*)

Gen. char. *Sori* non-indusiate superficial, narrow linear, sub-parallel, unequally anastomosed, *i. e.*, the lines more or less but sparingly united, sometimes only at the ends ; the *receptacles* thus reticulated. *Veins* simple or forked from a central costa, parallel below forming elongate oblique areoles, more closely reticulated near the margin forming one or two series of shorter areoles, the ultimate veinlets sometimes free.

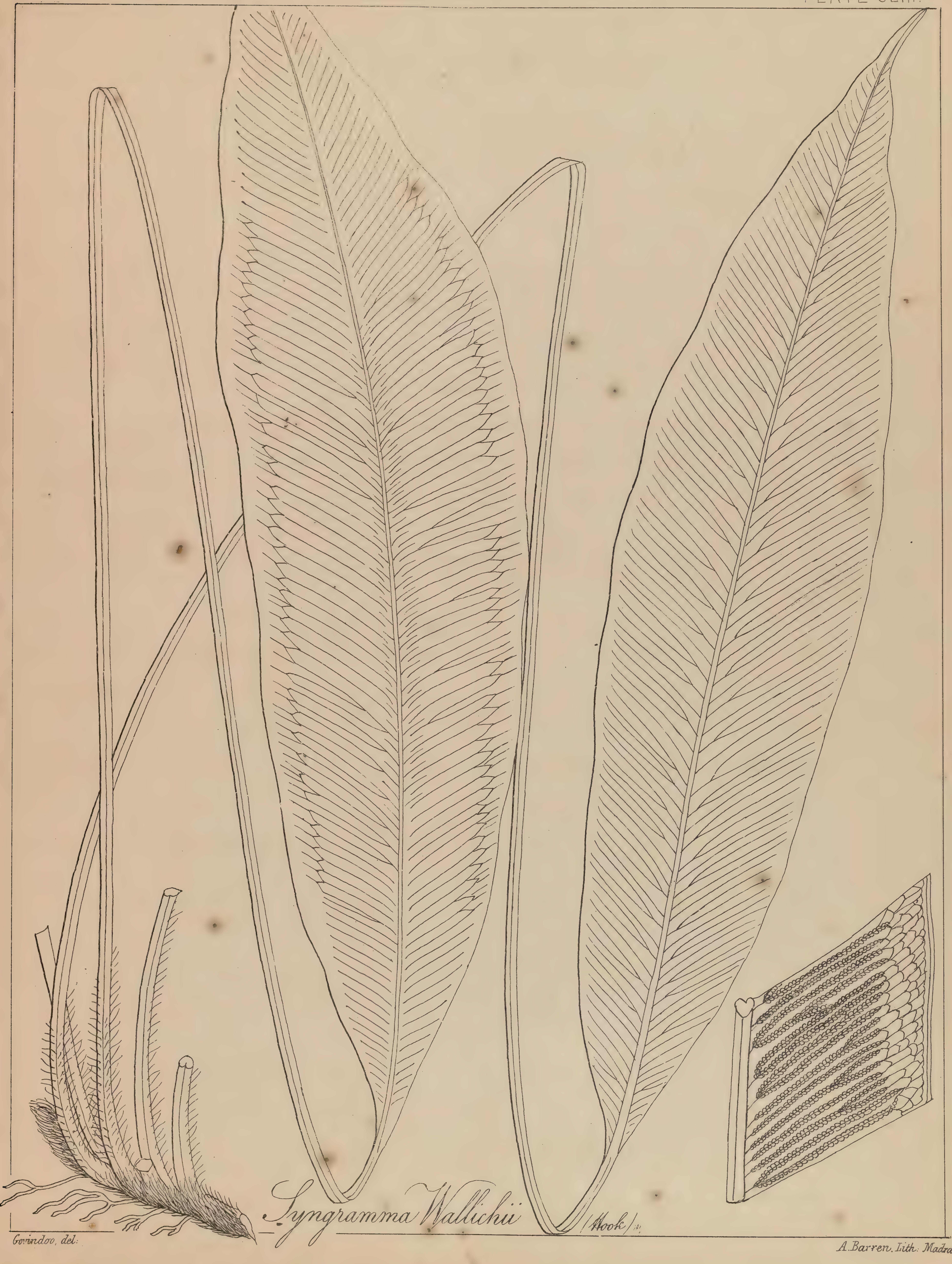
Fronds simple or pinnate sub-membranaceous. Rhizome short erect or creeping—(*Moore.*)

SYNGRAMMA WALLICHII. (Hook.) Caudex creeping underground, stipites subfasciculate a span to 1½ foot long black, purple, fronds subcoriaceo-membranaceous simple 6-10 inches long 1½-2 inches wide in the middle broad-lanceolate or subelliptico-acuminated entire narrow cuneato-attenuate at the base, veins numerous approximate simple or forked anastomosing only at the margin into 1-2 rarely more series of a oblong hexagonal areoles, sori narrow-linear on all the straight veins, but scarcely extending to the anastomosing ones.—*Hook. Sp. Fil.* v. 155.

The figure is taken from Sir W. Hooker's Sp. Fil.

Hab. Singapore, Borneo, Sarawak, and Labuan.

PLATE No. CLIII.



Syngramma Wallichii (Hook) .

Govindoo, del:

A. Barren, Lith: Madras.

SYNGRAMMA.

SYNGRAMMA VESTITA. (Moore.) Caudex ? base of stipes clothed with golden scales, stipes 2-4 inches long, fronds 6-12 inches long 1-1$\frac{3}{4}$ inch broad, everywhere as well as the rachis and stipes velvetty with long sericeous golden hairs, most copious beneath, subcoriaceo-membranaceous, pinnated to the apex alternate 7-14 on each side $\frac{1}{2}$ to one inch long, petiolate oblongo-ovate obtuse entire often with an auricle at the superior base, veins simple forked or pinnate where pinnate the lower venules anastomose and form elongated costal areoles, sori universal on the veins. Grammitis ? *Wall.*—Gymnogramme (Eugymnogramme) vestita. *Hook. Sp. Fil.* v. 143 ?

The specimen figured is from N. W. Himalaya, (Hook. Fil. and Thomson.)

Hab. N. W. Himalaya, 5-8,000 feet elevation.

PLATE No. CLIV.

Syngramma vestita.
(*More*)

vindoo, del:

A. Barren, Lith: Madras.

§12. HEMIONITIDEÆ.

(c.) Veins pinnate; venules reticulated.

DICTYOCLINE. *Moore. Gard. Chron.* 1855. 854.

Gen. char. *Sori* non-indusiate, narrow-linear, superficial on the anastomosing venules, the *receptacles* therefore reticulated. *Veins* pinnate from a central costa; venules transversely anastomosing forming 2 or 3 series of roundish-hexagonal areoles between the primary veins.

Fronds coarse herbaceous pinnate with 3-4 pairs of pinnæ very hairy. Sori reticulated between the primary veins. Rhizome short thick decumbent. (*Moore.*)

This genus differs from Hemionitis in having pinnate venation, and in the sori only occurring on the venules.

DICTYOCLINE GRIFFITHII. (Hook. Fil. et Thomson.) Caudex ? stipites 8-12 inches long villous paleaceous at the base with subulate scales, fronds coriaceo-membranaceous, villous especially on the venation 8-10-14 inches long 6-8 inches broad cordato-ovate acuminate pinnatifid or oblong or broad-ovate and pinnated, pinnœ about nine, 6 inches long by 1-1½ inch wide petiolate oblong subfalcate acuminate entire rotundato-cuneate at the base, terminal pinnæ large-petiolate acuminately pinnatifid, its lowest pair of segments much the longest, the basal pair of pinnæ the largest broad oblong falcate and acuminate more or less lobed the rest gradually smaller upwards, the apex acuminated entire, pinnæ and larger segments costate with the costæ pinnated the rest of the venation reticulated, costal areoles the largest.—Var. α. pinnata Hemionitis Griffithii. *Hook. Fil. et Thom;*—Var. B. pinnatifida. Hemionitis Wilfordii. *Hook, Fil. Exot. t.* 93. *Hook. Sp. Fil.* v. 193.

The specimen figured is from Khasya (Hook. Fil. and Thom.)

Hab. Khasya, Formosa.

PLATE No. CLV.

Dictyocline Griffithii
(Hook fil, et Thom.)

Govindoo. del:

A. Barren, Lith. Madras.

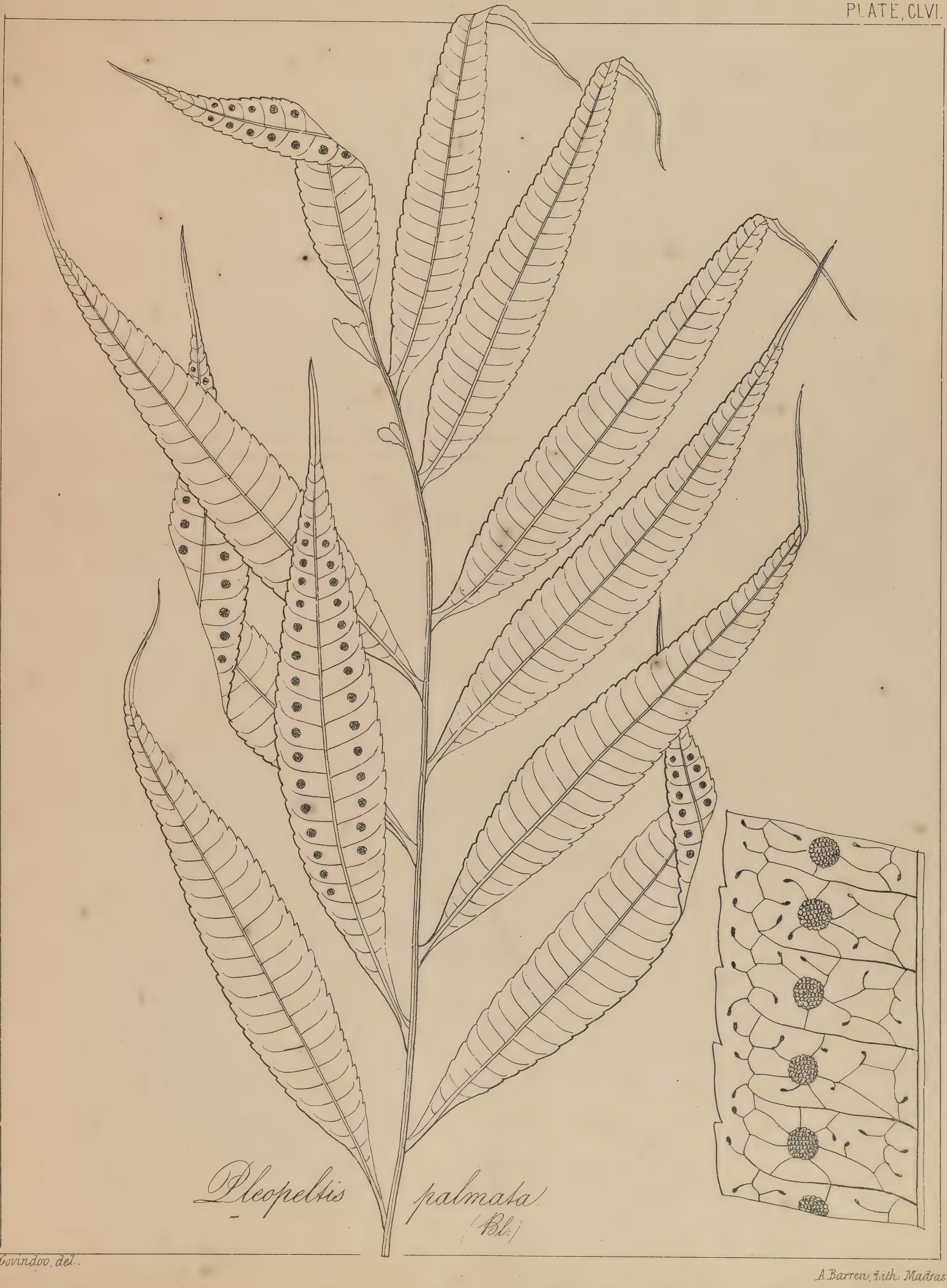
PLEOPELTIS. (See "Ferns of Southern India," p. 57.)

PLEOPELTIS PALMATA (Bl.) Caudex creeping ferruginous with copious large glossy lanceolate long acuminated scales, stipites a span to a foot and more long slender, fronds 6-8 inches long subcoriaceo-membranaceous glabrous broad-ovate acuminate cuneate attenuated at the base deeply pinnatifid or not unfrequently decurrently pinnate or truly pinnate with the always sessile or more or less decurrent pinnæ or segments 3-12 5-6 inches long alternate with very obtuse sinuses terminal one the largest; sterile ones 1-2 inches wide broad lanceolate; fertile ones generally longer, all of them contracted near the base very finely and subcordately acuminated entire, pinnate veins very manifest extending nearly to the margin united by very slender indistinct venules which form 3-4 areoles in which are included free incurved clavate veinlets, sori in a single series. *Hook. Sp. Fil.* v. 89; *Bl. Fil. Jav. p.* 150 *t.* 64 (*not Pr.*)—Drynaria *J. Sm.*; Ployp: Lindleyanum *Wall. Cat. n.* 304. Phymatodes Meyeniana. *Presl.*

The specimen figured is from Singapore.

Hab. Java. Island of Ternate, Luzon, Singapore, Penang.

PLATE No. CLVI.



Pleopeltis palmata (Bl:)

Govindoo, del.

A. Barren, Lith: Madras

PLEOPELTIS.

PLEOPELTIS OVATA. (Wall.) Caudex creeping apparently under-ground slightly paleaceous, stipites distant 3-8 inches long sparsely paleaceous below, fronds firm-membranaceous glabrous 5-11 inches long 2-3 inches broad, ovate or ovato-lanceolate acuminate entire the broad base rather suddenly attenuated so as to form a decurrent wing on the upper part of the stipes, costules very evident slightly prominent straight or flexuose connected by transverse veins on which the sori are inserted, the areoles are filled with reticulated veins with or without free included veinlets, the sori are very large and prominent when mature chiefly confined to the centre of the frond distant from the margin scarcely arranged in series, occasionally two are confluent. *Hook. Sp. Fil.* v. 64 ; *Wall. in Hook. and Grev. Ic. Fil. t.* 41.

The specimen figured is from the Khasya Hills, (Hook Fil. and Thomson.)

Hab. Khasya, Bhootan, Sikkim—Himalaya, Nepal.

PLATE No. CLVII.

Pleopeltis ovata. (Wall.)

Govindoo, del. A. Barren, Lith. Madras.

PLEOPELTIS.

PLEOPELTIS GRIFFITHIANA. (Hook.) Caudex long creeping paleaceous with long subulate ferruginous scales, stipites very remote 3-6 inches long, fronds chartaceo-coriaceous glabrous 6-8 inches long $1\frac{1}{2}$-2 inches broad oblongo or ovato-lanceolate entire or obsoletely crenate, acuminate, cuneate at the base sometimes glaucous beneath, the margin thickened, costules very distinct straight prominent beneath, the rest of venation less distinct more or less anastomosing with copious free veinlets in the areoles, sori very large globose compital forming a single series on each side of and close to the costa.—*Hook. Sp. Fil.* v. 62 ; *Cent. of Ferns t.* 51 *and Ic. Pl. t.* 951.

The specimen figured is from Khasya, (Hook. Fil. and Thomson.)

Hab. Bhootan, Mishmee, Khasya.

PLATE No. CLVIII.

Govindoo, del:

A. Barren, Lith: Madras.

PLEOPELTIS.

PLEOPELTIS ROSTRATA. (Hook.) Caudex very long filiform creeping branched setaceous with very slender subulate scales, stipites remote 1-2 inches long, fronds scarcely dimorphous from 2-4½ inches long ½ an inch to an inch wide coriaceo-membranaceous opaque glabrous lanceolate or elliptical or ovato-lanceolate rather suddenly subrostrato-acuminate ; sterile ones often the shortest and most obtuse, venation internal obscure, veins copiously reticulated, areoles mostly oblong angular obliquely directed from the costa (no costules) each including one simple or branched veinlet sori very large in a single series on each side and near to the costa occupying the upper half of the frond or nearly the whole length. *Hook. Sp. Fil.* v. 66 ; *Cent of Ferns t.* 53, *or Ic, Pl. t.* 953.

The specimen figured is from Khasya, (Hook. Fil. and Thomson.)

Hab. Eastern Himalaya, Khasya, Mishmee, Bhootan.

PLATE No. CLIX.

Pleopeltis rostrata.
(Hook)

GOVINDOO. DEL. A. BARREN. LITH: MADRAS.

DRYNARIA. (See "Ferns of Southern India," p. 63.)

DRYNARIA PROPINQUA. (Wall.) Caudex long very stout creeping densely clothed with lanceolato-subulate delicate membranaceous fringed ferruginous scales, fronds coriaceo-membranaceous dimorphous; sterile 4-6 inches and more long firm and hard scarioso-membranaceous brown sessile cordato-ovate deeply pinnatifid with narrow oblong acute rarely obtuse segments; fertile ones long stipulate 1-2 feet long oblong-ovate deeply almost to the rachis pinnatifid, segments 4 inches to a span or more long linear-oblong acute or acuminate subentire (one specimen from Khasya deeply sinuato-pinnatifid) lowest ones distant and subdecurrent, venation manifest slight elevated (so as to give a sculptured character to the surface when dry) costules subreniform flexuose connected by transverse veins forming 4-5 areoles of which the costal one only is soriferous, ultimate small areoles subquadrangular often with free included veinlets, sori forming only a single series close to the costa. *Hook. Sp. Fil.* v. 97; *Wall. Cat. n.* 293.—Phymatodes *Presl*;—Polp. Willdenovii. *Bl. Fil. Jav. p.* 156 *t.* 66?

The specimen figured is from Simla.

Hab. Nepaul, Simla, Sikkim, Khasya, Assam, (5-7,000 alt.), Tropical Africa, Prince's Island, Ferando Po.

PLATE No. CLX.

Drynaria propinqua. (Wall.)

GOVINDOO. DEL.

A. BARREN. LITH. MADRAS.

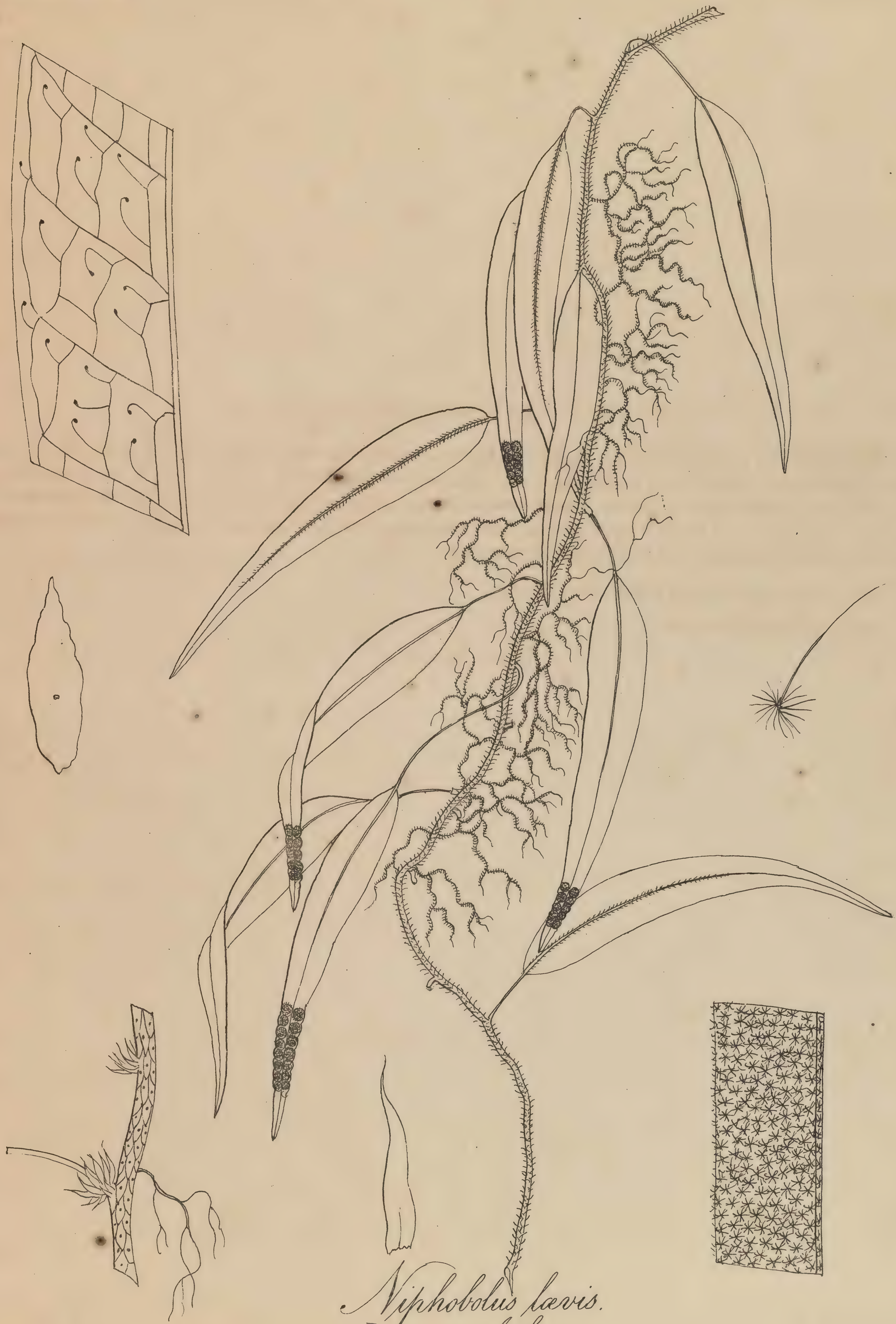
NIPHOBOLUS. (See "Ferns of Southern India," p. 61.)

NIPHOBOLUS LÆVIS. (J. Sm.) Caudex creeping clothed with linear setaceous scales, stipites distant ½ an inch to 2 inches long furnished with a tuft of scales at their base, fronds coriaceous linear lanceolate 2½ to 6 inches long, ¼ to ¾ of an inch broad, glabrous above hoary with stellated pubescence beneath, venation obscure, areoles between the costules 3, in each of which are 1, 2, 3 clavate veinlets variously directed free or rarely joined to the base of the areole above. Sori large partially sunk in the tomentum covering nearly the whole of the underside of the frond or confined to the apex.

The specimen figured is from Khasya, (Dr. Thomson.)

Hab. Himalayas, Khasya Hills.

PLATE No. CLXI.



Niphobolus lævis.
(J. Sm.)

GOVINDOO. DEL: A. BARREN. LITH. MADRAS.

NIPHOBOLUS.

NIPHOBOLUS DETERGIBILIS. (J. Sm.) Caudex rather stout densely fibroso-radicant paleaceous especially about the base of the stipites with finely subulate ferruginous scales, stipites 4-6-8 inches long aggregated clothed as is the whole plant with a dense compact mass of whitish or ferruginous stellated tomentum which not unfrequently peels off in dense cottony masses from the upper side of the fronds leaving that part quite naked and glabrous, fronds from 4-16 inches long $\frac{3}{4}$-$1\frac{1}{2}$ inch broad carnoso-coriaceous younger ones often ovato-acuminate mature ones lanceolate finely acuminate subsinuate moderately attenuate decurrent not unfrequently broader and subhastate at the base then suddenly cuneate, sometimes wrinkled above by the impressions of the sori from the other side and obscurely nigro-punctate, below the stellated tomentum is long retained, venation immersed, costules indistinct, intervening areoles 9-15, veinlets 3-5 irregular free or meeting a veinlet from the base of the areole above sori scarcely sunk small and but slightly elevated above the tomentum very copious arranged with great regularity.—*Hook. Sp. Fil.* v. 49 ;—Polypodum vestitum. *Wall. Ms.*

The specimen figured is from the Himalayas (Dr. Stewart.)

Hab. Chiefly North Bengal and along the lower ranges of the Himalayas from very low altitudes of Silhet and Assam to 3,500 feet in Kumaon—from Simla in the west to Bhootan in the east. Nepal.

PLATE No. CLXII.

GOVINDOO. DEL:

A. BARREN. LITH. MADRAS.

GONIOPHLEBIUM. (See page 5.)

GONIOPHLEBIUM LACHNOPUS. (Wall.) Caudex long creeping thick as a writing-pen densely clothed with long black setaceous bristles, stipes 2-4 inches long stramineous-brown, fronds membranaceous 6-8 inches to $1\frac{1}{2}$ foot long $1\frac{1}{2}$-$3\frac{3}{4}$ inches wide oblong terminating in an acuminated nearly entire apex, deeply nearly to the rachis pectinato-pinnatifid, segments linear or linear-oblong acute or obtuse, dentato serrate, lowest pair sometimes deflexed, veins forming a costal soriferous series of large areoles (partially free) marginal veinlets short free clavate, soriferous veinlet arising from the side of the vein distant from the costule, sori orbicular rarely oval, nearer the costa than the margin, rachis beneath often subpaleaceous with orbicular spinuloso-dentate scales terminated by a long seta. *Hook. Sp. Fil.* v. 25 ; *Wall: Cat. n.* 310.—Polypodium Fieldingianum. *Kze.—Mett. Polyp.* 75.

The specimen figured is from Simla, (Dr. Stewart.)

Fig. A. is a pinna of a curiously cut variety from Sikkim, (Dr. Anderson.) Fig. B. is a pinna of a frond with free venation.

Hab. Nepaul, Kumaon, Khasya (4-6,000 feet) Sikkim, (9-11,000 feet) Simla, Kumaon (7,000 feet.)

PLATE No. CLXIII.

Goniophlebium lachnopus (Wall.)

GOVINDOO. DEL.

A. BARREN. LITH: MADRAS.

§ 14—PLATYLOMEÆ.

(b.) *Fertile divisions siliculiform.*

CRYPTOGRAMMA. R. Br. App. Frankl. Journ. 767.

(Allosori Sp. *Auct* ;—Gymnogrammatis Sp. *Presl* ;—Phorolobus *Sp. Fée.*)

Gen. char. *Sori* spuriously-indusiate, oblong or linear, at length laterally confluent into an intramarginal band, covered by the revolute attenated indusiiform margins of the pinnules ; the *receptacles* also oblong or linear, near the apices of the veins. Veins simple or forked, from a central costa, which is sometimes evanescent in the sterile fronds ; venules free.

Fronds dimorphous, dwarf, herbaceous, bi-tri-pinnate, the fertile contracted, *i. e.*, with revolute siliculiform pinnules. Rhizome short decumbent. Differs from Allosorus in having oblong oblique not punctiform receptacles. (Moore.)

CRYPTOGRAMMA BRUNONIANA. (Wall.) Caudex short thick subrepent, roots fibrous, fronds erect stout somewhat rigid, pinnules of the sterile fronds of two kinds, subovate deeply cut into 2-5 oblong segments, rarely elliptical and pinnatifid serrated. those of the mature fertile fronds rather broad oblong with the margins spread open (not permanently revolute). *Wall. Cat.* 396. *Hook, et Grev. Ic. Fil. t.* 158. C. crispa. var. B. *Hook. Sp. Fil.* ii. 129.—Gymnogramme Brunoniana. *Presl. Tent. Pterid. p.* 219.—Phorolobus Brunonianus *Fée. Gen. Fil. p.* 131.

The specimen figured is from Sikkim-Himalaya elev. 13,000 feet (Dr. Thomson.)

Hab. North India, Kumaon, 12,000 feet.—Balti. N. W, Thibet. Shayak Valley 9,000 feet, above Simla, Sikkim-Himalaya, 11-13,000 feet, Choor.

PLATE No. CLXIV.

GOVINDOO. DEL.

A. BARREN. LITH: MADRAS.

PLAGIOGYRIA. (See page 51.)

PLAGIOGYRIA EUPHLEBIA. (Kze.) Caudex stout woody a foot high, fronds cæspitose on long stipites incrassated triquetrous and carnose and bearing spongy glands at the base, fronds pinnate throughout 1-2 feet long subchartaceous, olive-brown when dry, sterile ones broadly ovate-lanceolate, pinnæ erecto-patent 5-6 inches long remote uniform the ultimate quite free larger than the rest, all sessile or the lower ones shortly but distinctly petioled elongato-lanceolate quite cuneate at the base, the margin bluntly and rather obscurely serrated the acuminated apex strongly serrated the base beneath destitute of glands, veins rather distant mostly once forked, fertile fronds narrower and more oblong, pinnæ linear or broad linear elongated obtuse, capsules clothing the whole under-side between the costa and the brown membranaceous involucre.—*Hook. Sp. Fil.* iii. 20.—*Kze. in Bot. Zeit.* vi. 521 ;—Acrostichum triquetrum. *Wall. Cat. n.* 23 *in part*;—Olfersia triquetra *Tent. Pter. p.* 234.—Stenochlæna triquetra *J. Sm. in Hook Journ. of Bot.* iv. *p.* 149.

The specimen figured is from Khasya, (Dr. Thomson.)

Hab. Nepaul, Assam, Khasya (alt. 6,000), Japan.

PLATE No. CLXV.

Plagiogyria euphlebia (Kze.)

GOVINDOO. DEL.

A. BARREN. LITH. MADRAS.

LINDSÆA. (See "Ferns of Southern India," p. 7.)

LINDSÆA RIGIDA. (J. Sm.) Caudex long creeping scaly, rough with short distant inconspicuous prickles, frond bipinnate rigid (rufescent) subfalcate, pinnæ 7-9 remote linear alternate falcate, terminal one very long, pinnules approximate coriaceous flabellate or rhombeo—or oblong—flabellate, upper base truncate, lower margins straight or slightly arched, upper one semi-circular lobed and crenated margined, veins very prominent on both sides, sori abbreviated quite marginal on one or two terminal lobes, involucres coriaceous. *Hook. Sp. Fil.* i. 217. *J. Sm. in Hook. Journ. of Bot.* iii. *p.* 415.

The specimen figured is from Malacca.

Hab. Malacca, Mount Ophir.

PLATE No. CLXVI.

Lindsæa rigida (J. Sm.)

GOVINDOO DEL: A. BARREN_LITHOG. MADRAS. 1866.

ADIANTUM. (See "Ferns of Southern India," p. 1.)

ADIANTUM PEDATUM. (L.) Frond flabelliform bipartito-pedately divided tripinnate, secondary pinnæ lanceolate, pinnules membranaceous dimidiate oblong antrorsely subfalcate broadest at the superior truncated base very obtuse, lowest ones triangular-cuneate all petiolate, superior margin obtusely lobed, lobes soriferous, sori oblong rarely curved, stipes and rachis ebeneous glabrous. *Hook. Sp. Fil.* ii. 28. *Linn. Sp. Pl.* 1557. *Sw. Syn. Fil.* 121;—Adiantum boreale *Pr. Tent. Pter. p.* 158.

The specimen figured is from the Himalayas, (Dr. Stewart.)

Hab. Northern India, Kumaon, Jumnotri, North America, Virginia to Canada (Lake Huron); North West America, California to Sitka; Unalaschka.

PLATE No. CLXVII.

Andiantum pedatum (L.)

GOVINDOO - DEL:

A. BARREN _ LITHOG: MADRAS. 1866.

ASPIDIUM. (See "Ferns of Southern India," p. 40.)

ASPIDIUM SINGAPORIANUM. (Wall.) Caudex more or less creeping very fibrous, stipites approximate sometimes tufted 6-12-14 inches long sparsely setosely subalato-paleaceous, fronds 6-12 inches long firm membranaceo-coriaceous (dark brown when dry), ovate or oblong, much acuminated at the apex, suddenly or generally long, decurrent at the base quite entire, costa prominent beneath, primary veins horizontally patent subfalcate united by transverse arched ones, the areoles of which enclose netted veinlets, the ultimate ones free; sori forming transverse arched lines in double rows between secondary (transverse) veins about six in each row, involucres orbicular peltate. *Hook. Sp. Fil.* iv. 42. *Wall. Cat. n.* 374;—Podopeltis, *Fée. Gen. Fil. p.* 286. *t.* 23 *A.*;—Polypodium Phyllitidis *Roxb. in Calc. Journ. Nat. Hist.* iv. *p.* 483.

The specimen figured is from Singapore.

Hab. Malay Islands, Singapore, Penang, Malacca.

PLATE No. CLXVIII.

Aspidium Singaporianum
(Wall:)

GOVINDOO. DEL.

A. BARREN LITHOG. MADRAS 1866.

SAGENIA. (See "Ferns of Southern India," p. 27.)

SAGENIA ALATA. (Wall.) Caudex creeping ? Stipites rather distant 1-2 feet long but winged a long way down sometimes almost to the base and there subulato-paleaceous, fronds subcoriaceo-membranaceous 2-3 feet and more long oblong deeply pinnatifid with 4-5 pairs of distant oblong (6-18 inches long and 1-2 wide) or strap-shaped acuminated segments, inferior ones entire or bipartite, primary veins horizontally patent slender, connected by transverse zigzag secondary ones forming areoles which include anastomosing veins with free veinlets, sori small very copious scattered without order arising from reticulations (hence compital) not extending to the margin, involucre small cordate. *Hook. Sp. Fil.* iv. 47. *Wall. Cat. n.* 378 ;—Bathmium *Fée.* ;—Aspidium vastum, *Bl. En. p.* 142.

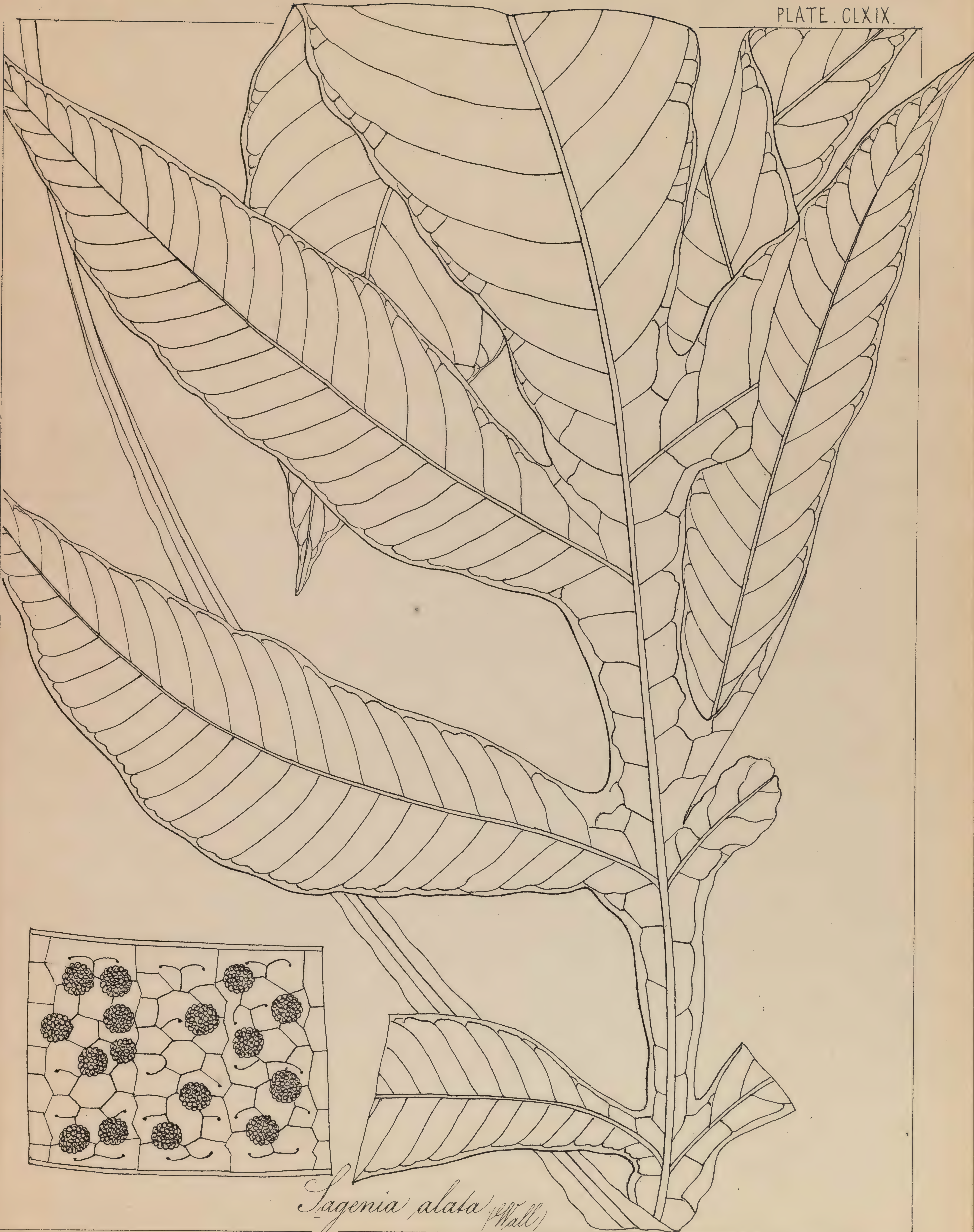
Very nearly allied to S. pteropus (Kze.), but the sori are copious and scattered without order, instead of being in two rows between the primary veins, the magnified portion in the figure represents a portion of the frond between two primary veins.

The specimen figured is from the Khasya Hills, the involucres had all fallen off and so are not represented.

Hab. Sylhet, Khasya, Assam, Malacca, Singapore, Borneo, Java.

PLATE No. CLXIX.

PLATE . CLXIX.



Sagenia alata (Wall)

COVINDOO. DEL.

A. BARREN. LITHOG. MADRAS.

SAGENIA.

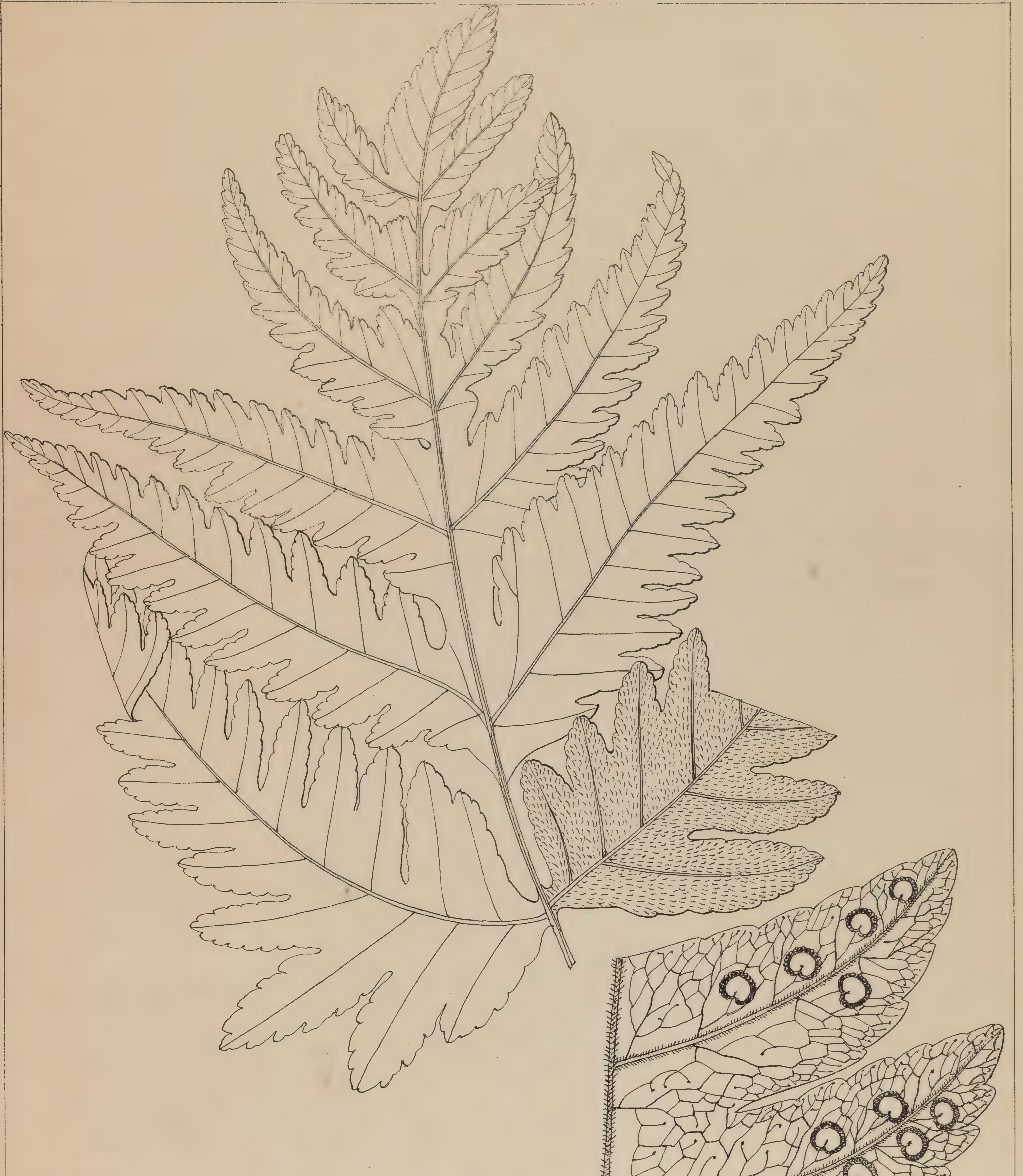
SAGENIA VARIOLOSA. (Wall.) Caudex stout creeping, stipites approximate subcæspitose a span to 1-1½ foot long, sparingly paleaceous at the base, fronds coriaceo-membranaceous a span to a foot and more long, glabrous cordate or cordato-ovate acuminate trifoliate or more frequently pinnate with two or three nearly opposite pairs of pinnæ and a larger terminal one more or less-petiolate, lowest pair large half-ovate bifid or bipartite or bifoliate, intermediate pairs lanceolate lobato-pinnatifid, inferior lobes the longest, terminal one sub-rhomboidal below, deeply pinnatifid with long acuminated entire of lobed segments, primary veins from the costa patent slender more or less waved remote, the rest of the veins uniformly anastomosing with areoles enclosing free simple or forked veinlets, sori scattered most copious near the margins of the pinnæ compital or more frequently terminal on a vein within a large areole. *Hook. Sp. Fil.* iv. 51. *Wall. Cat. n.* 379;—Sagenia variolata *Moore ?*—Aspidium coadunatum ? in part Mett. Asp : p. 281.

Very closely allied to Sagenia coadunata.

The figure represents the upper portion of a frond and is taken from a specimen from Parasnath, Bengal, (Dr. Thomson.)

Hab. Amherst, Tavoy, Penang, Moulmein, Chittagong, Mergui, Parasnath, Telyn above Sylhet.

PLATE No. CLXX.



Sagenia variolosa.
(Wall.)

GOVINDOO. DEL.

A. BARREN. LITHOG. MADRAS 1866.

POLYPODIEÆ.

Margins of the fronds revolute, indusioid (i.e., sori spuriously indusiate.

STRUTHIOPTERIS.—*Willd. Mag. Nat. Ber.* 1809. 160.

(Onoclea, *Bernhardi and Auct.* Osmandæ Sp. Linnæus.)

Gen. Char. *Sori* spuriously-indusiate, rotundate, approximate, at length becoming sub-confluent, covered by the revoluto-convolute attenuated (membranaceo-scariose) margin of the frond, which simulates an universal indusium ; the *receptacles* medial prominent. *Veins* simple or forked, from a central costa ; *venules* free.

Fronds demorphous, the sterile herbaceous pinnato-pinnatifid ; the fertile pinnate, with the pinnæ much contracted moniliform, the margins rolled inwards so as to cover the sori ; Rhizome erect caudiciform, producing stolones. (*Moore.*)

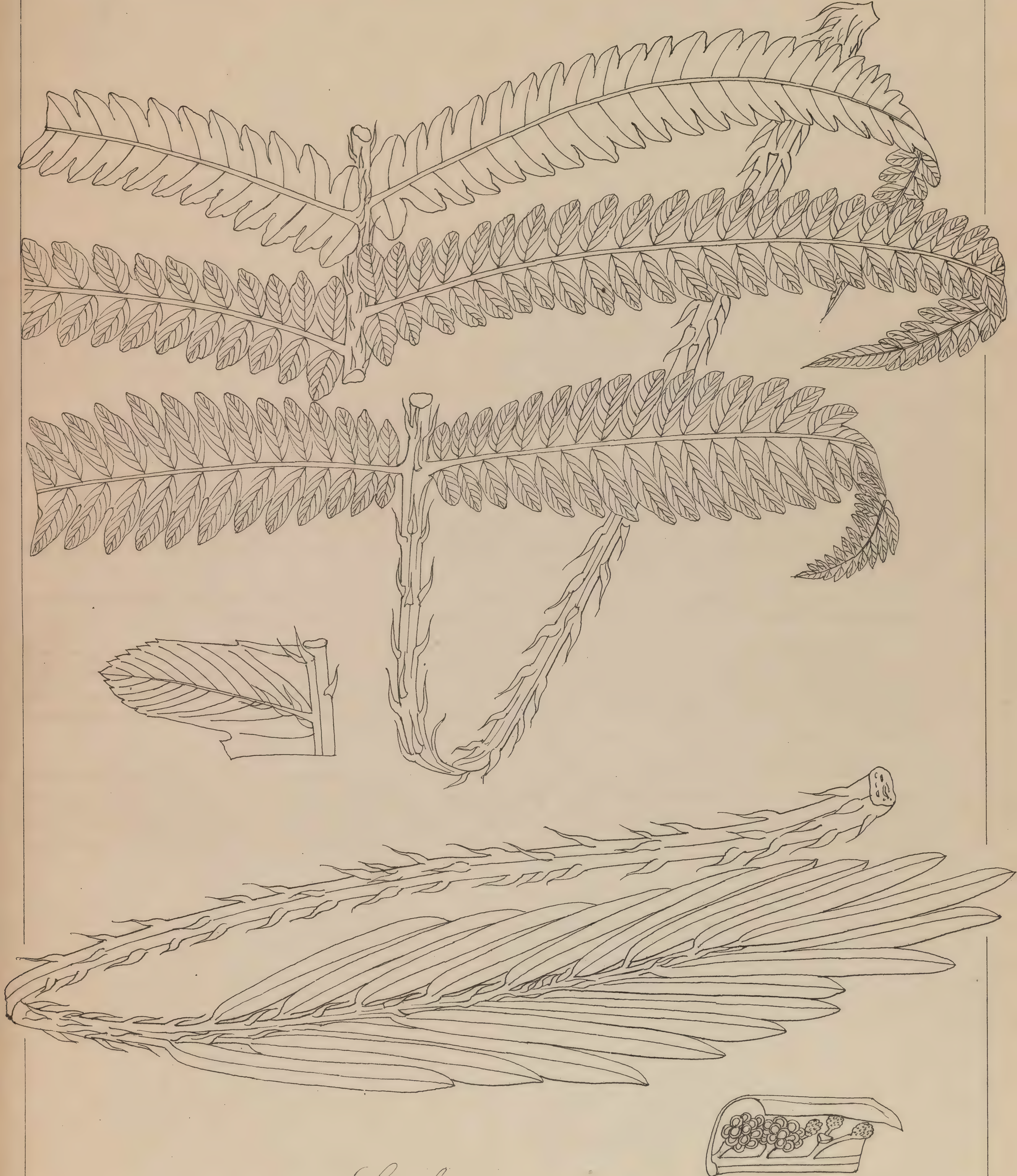
A genus with a very doubtful resting place in the classification of ferns. Sir Wm. Hooker unites it with Onoclea, a genus with anastomosing venation and a cucullate membranaceous indusium of doubtful structure, and states that a very fragile inferior involucre has been detected in Struthiopteris Germanica (an allied species), although he could detect nothing of the sort in dried specimens of this species. Mettenius also unites the 2 genera and places them next to Woodsia. Moore follows Willdenow in keeping the 2 genera distinct, but places the present genus in Polypodieæ, and Onoclea in the Aspidieæ.

STRUTHIOPTERIS ORIENTALIS. (Hook.) Fronds 1-2½ feet long ovato-oblong not attenuated below, fertile fronds oblong, often 2-feet long contracted broad linear-oblong flattened 2-edged, the refracted margins at first covering the whole back of the frond dark purple brown glossy involucriform, entire at the edge, at length spreading, torn at the margin and exposing the fructification which is eventually confluent in a continuous line, stipes rachis and costa deciduously paleaceous. Onoclea (Struthiopteris) Orientalis. *Hook. 2nd Cent. of Ferns, tab.* 4 ; *Sp. Fil.* iv. 161.

The figure is taken from Hooker's 2nd Cent. of Ferns.

Hab. Sikkim, Himalaya (elev. 12,000 feet), Assam, Hakodadi, Japan.

PLATE No. CLXXI.



Struthiopteris orientalis. (Hook:)

GOVINDOO. DEL: A. BARREN. LITHOG: MADRAS 1866.

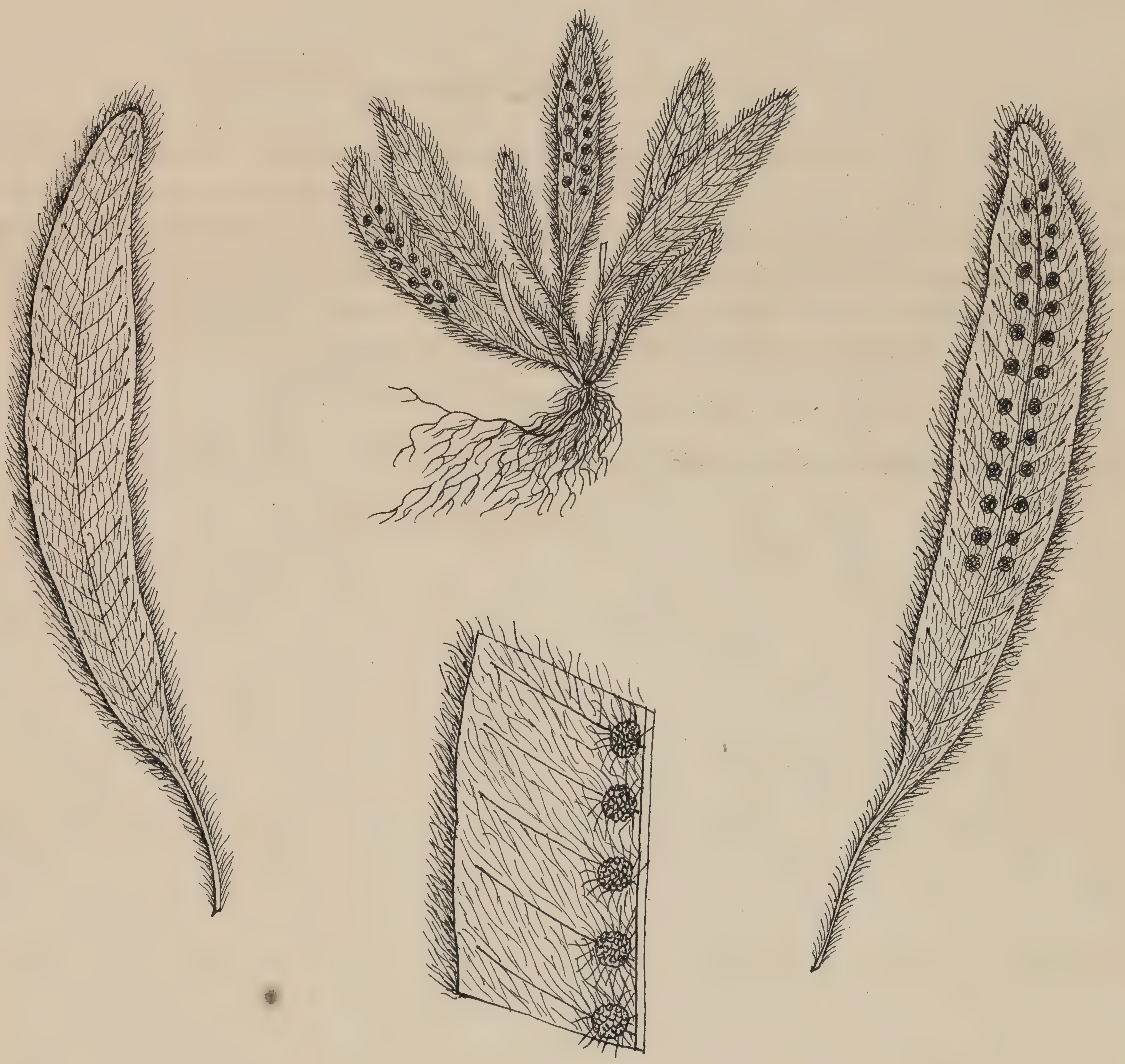
POLYPODIUM. (See "Ferns of Southern India," p. 54.)

POLYPODIUM LASIOSORUM. (Hook.) Caudex very small indistinct radiculoso-cæspitose, stipites tufted ½ an inch and rather more long slender filiform villous with patent ferruginous hairs, fronds subcoriaceo-membranaceous spathulato-lanceolate obtuse quite entire much attenuated at the base rather densely villous with long patent soft ferruginous hairs more or less deciduous in age, and ciliated on the margin with short hairs, veins simple never forked not extending to the margin, slightly thickened at the apex, sori globose occupying the upper half or ⅔ds of the frond, one on each vein near the base, copious hairs are intermixed with the capsules. *Hook. Sp. Fil.* iv. 166;—Grammitis pusilla, γ. lasiosorum. *Bl. En. Fil. Jav. p.* 110. *f.* 6. ;—Grammitis nana. *Fée,* 6*me. Mém. p.* 7. *t.* 6. *f.* 1.

The specimen figured is from Ceylon, where it has just been detected by Mr. Thwaites.

Hab. Ceylon (Bogawantalawa, Central Provinces, 5,000 feet elev. on trees), Java.

PLATE No. CLXXII.



Polypodium lasiosorum.
(Hook.)

GOVINDOO_DEL:

A. BARREN_LITHOG: MADRAS. 1866.

POLYPODIUM.

Polypodium Khasyanum. (Hook.) Caudex short creeping scaly, stipites short tufted (articulated upon the caudex) fronds a span to 14 inches long 1-1½ inch broad subcoriaceo-membranaceous hairy below and on the costa deeply nearly to the rachis pinnatifid with very acute sinuses, segments approximate horizontally patent from a broad and subdecurrent base oblong obtuse or the lower ones subtriangular or short and rounded entire or subsinuate ciliated, costules flexuose, and simple oblique veins apparent, sori short-oval eight or ten on each segment in 2 rows nearer the margin than the costa sunk into an oval cavity (having an elevation on the upper side of the frond) bordered by a raised margin. *Hook. Sp. Fil.* iv. 191. *Ic. Pl. t.* 949. *Cent. of Ferns, t.* 49. *Mett. Poly. p.* 50.

The figure is taken from Sir W. Hooker's Cent. of Ferns.

Hab. Khasya Hills, 4,000 feet elevation,—Assam.

PLATE No. CLXXIII.

Polypodium Khasyanum (Hook.)

GOVINDOO_DEL:

A. BARREN_LITHOG. MADRAS 1866.

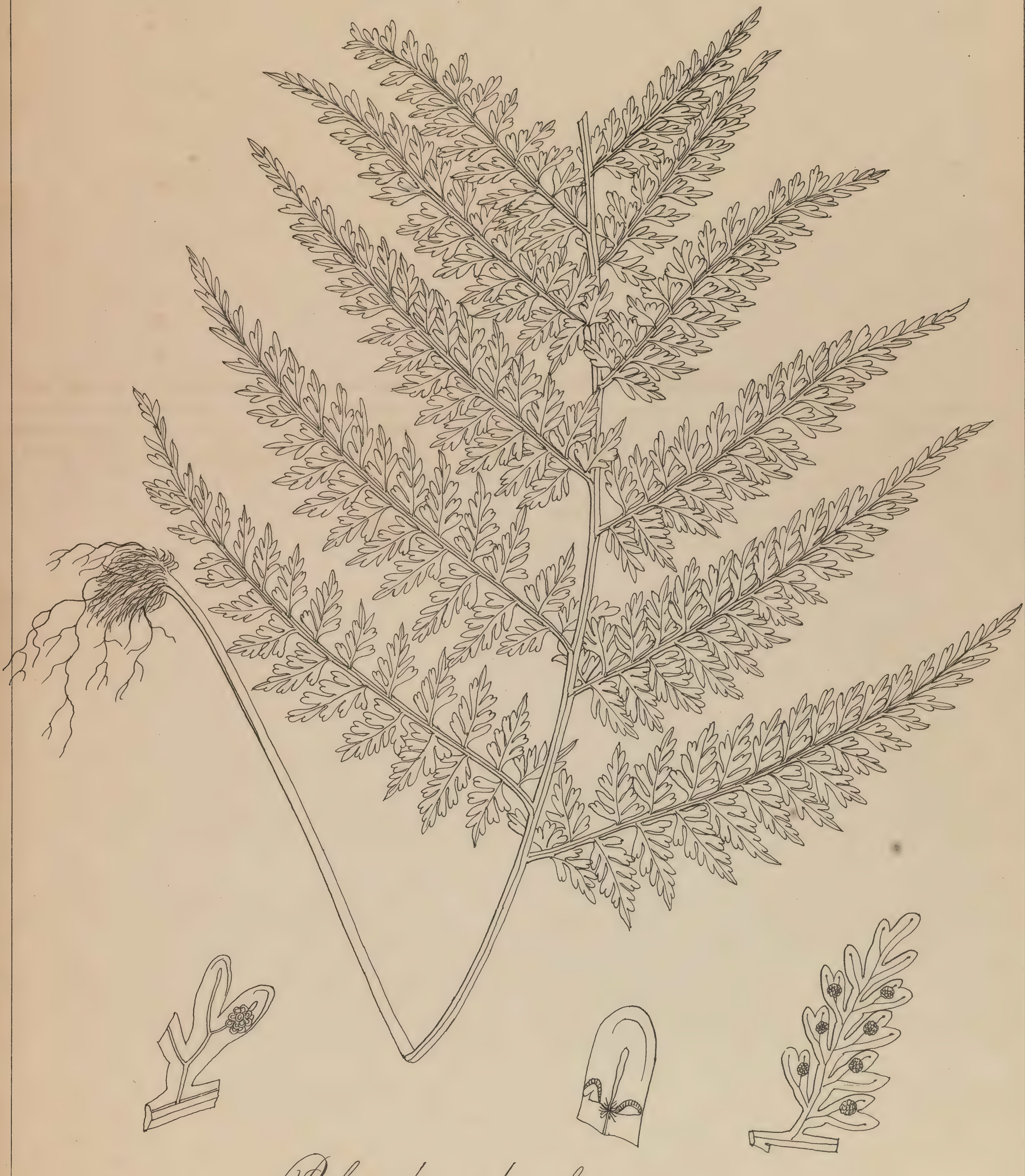
POLYPODIUM.

POLYPODIUM DAREÆFORME. (Hook.) Caudex thickish creeping densely ferrugineo-paleaceous with lanceolate much acuminated scales, stipes 4 inches long glossy pale-chestnut colored, frond a span long ovato-deltoid submembranaceous bipinnate, primary pinnæ 4-5 inches long 1½ inch wide, oblong-lanceolate subsessile acuminate subpinnatifid, segments linear or subspathulate obtuse simple or bifid, veinlets solitary in each segment clavate terminating below the apex bearing a sorus generally much below the clavate apex, capsules very few in each sorus. *Hook. Sp. Fil.* iv. 256. *2nd Cent. of Ferns, t.* 24.

The figure is taken from the 2nd Cent. (of Ferns.)

Hab. Khasya Hills, Birmah, (Parish in lit.)

PLATE No. CLXXIV.



Polypodium darecæforme.
(Hook.)

GOVINDOO_DEL: A. BARREN_LITHOG. MADRAS. 1866.

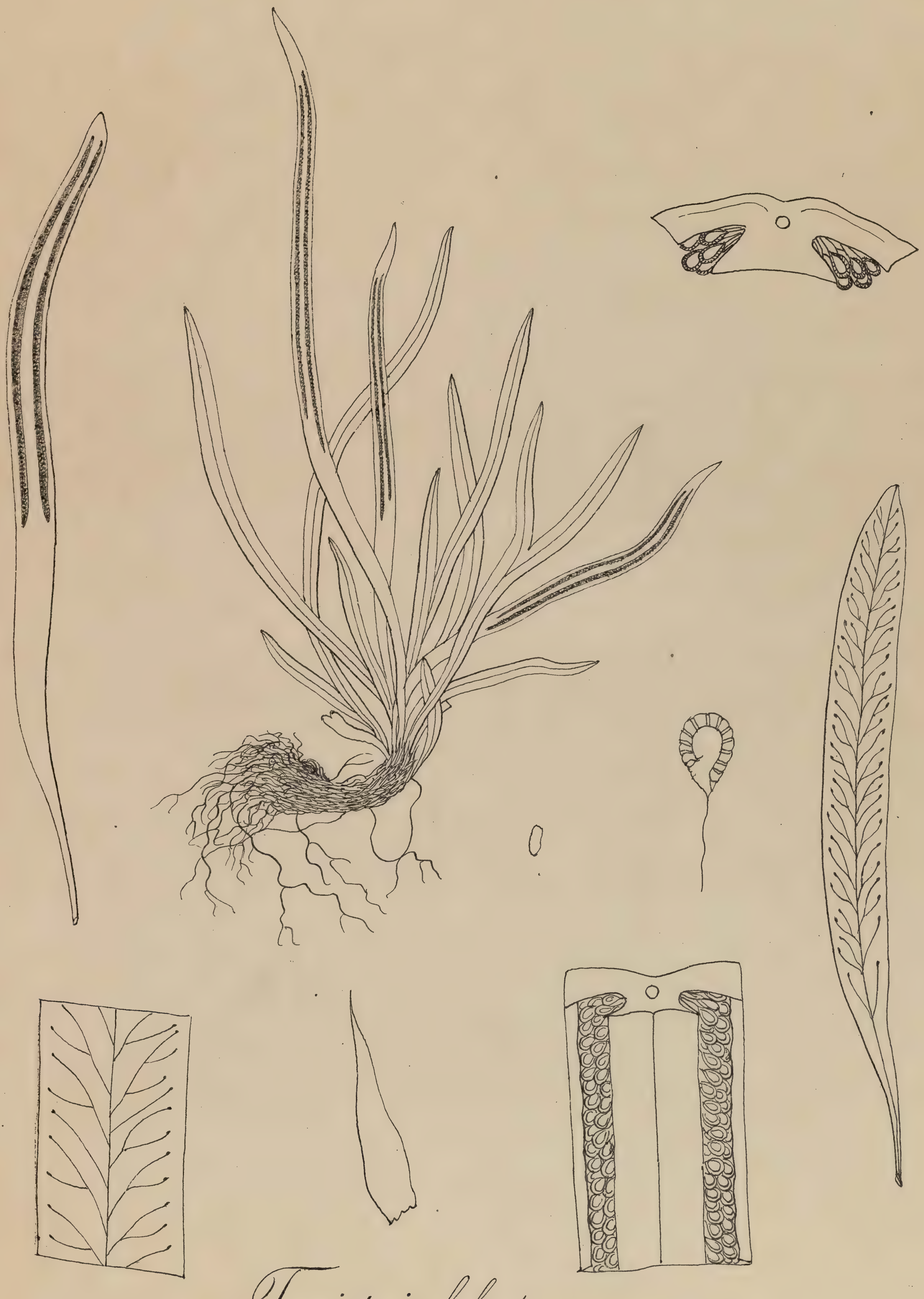
TÆNIOPSIS. (See "Ferns of Southern India," p. 18.)

TÆNIOPSIS FALCATA. (Kze ?) Caudex erect, fibrillose, furnished with lanceolate smooth brown scales at the apex, fronds rigid very thick 1 to 6 inches long $1\frac{1}{2}$-3 lines broad narrow linear acute, sometimes forked, glabrous or sometimes furnished on the upper side only with a few distant white hairs, costa canaliculate on the upper side of the frond, not visible on the underside ; veins (only visible in very young fronds when well soaked) simple, or once, (or very rarely twice) forked not extending to the margin, sori in a deep gaping sulcus somewhat distant from the margin. *Vittaria falcata. Fée. Vittar, p.* 20. *t.* 4. *f.* 1. Vide Thw : En : p. 438.

The specimen figured is from Ceylon, where it has just been discovered by Mr. Thwaites.

Hab. Ceylon (Central Provinces, elevation 4,000, 5000 feet) c. P. 3,807,—Java, Mount Ophir, Malacca.

PLATE No. CLXXV.



Tæniopsis falcata. (Kze)

GOVINDOO. DEL

A. BARREN. LITHOG. MADRAS.

ANTROPHYUM. (See "Ferns of Southern India," p. 17.)

ANTROPHYUM LATIFOLIUM. (Bl.) Stipites 3-6 inches long compressed 2 lines wide, fronds subcarnoso-coriaceous 3-7 inches long 3-5 inches wide ovato-subrhomboidal or obovate suddenly and sharply acuminated and sometimes subinciso-lobate below the acumen, the base cuneate and rather suddenly attenuated into the stipes, costa none, venation manifest, areoles very large oblongo-hexagonal subflabellately directed, most elongated in the disk, sori chiefly occupying the disk, very superficial elongated simple or branched rarely reticulated. *Hook. Sp. Fil.* v. 172. *Bl. En. Fil. Jav. p.* 75, *en note.*;—A. Boryanum ;—*Bl. Fil. Jav. p.* 75 *t.* 31. *excl. Syns.* ;—Hemionitis Blumeana,—*Pr. Tent. Pter. p.* 221.

The specimen figured is from the Khasya Hills.

Hab. Java, Khasya lower ranges, Mountains North of Assam.

PLATE No. CLXXVI.

Antrophyum latifolium (Bl.)

GOVINDOO. DEL:

A. BARREN, LITHOG. MADRAS 1866

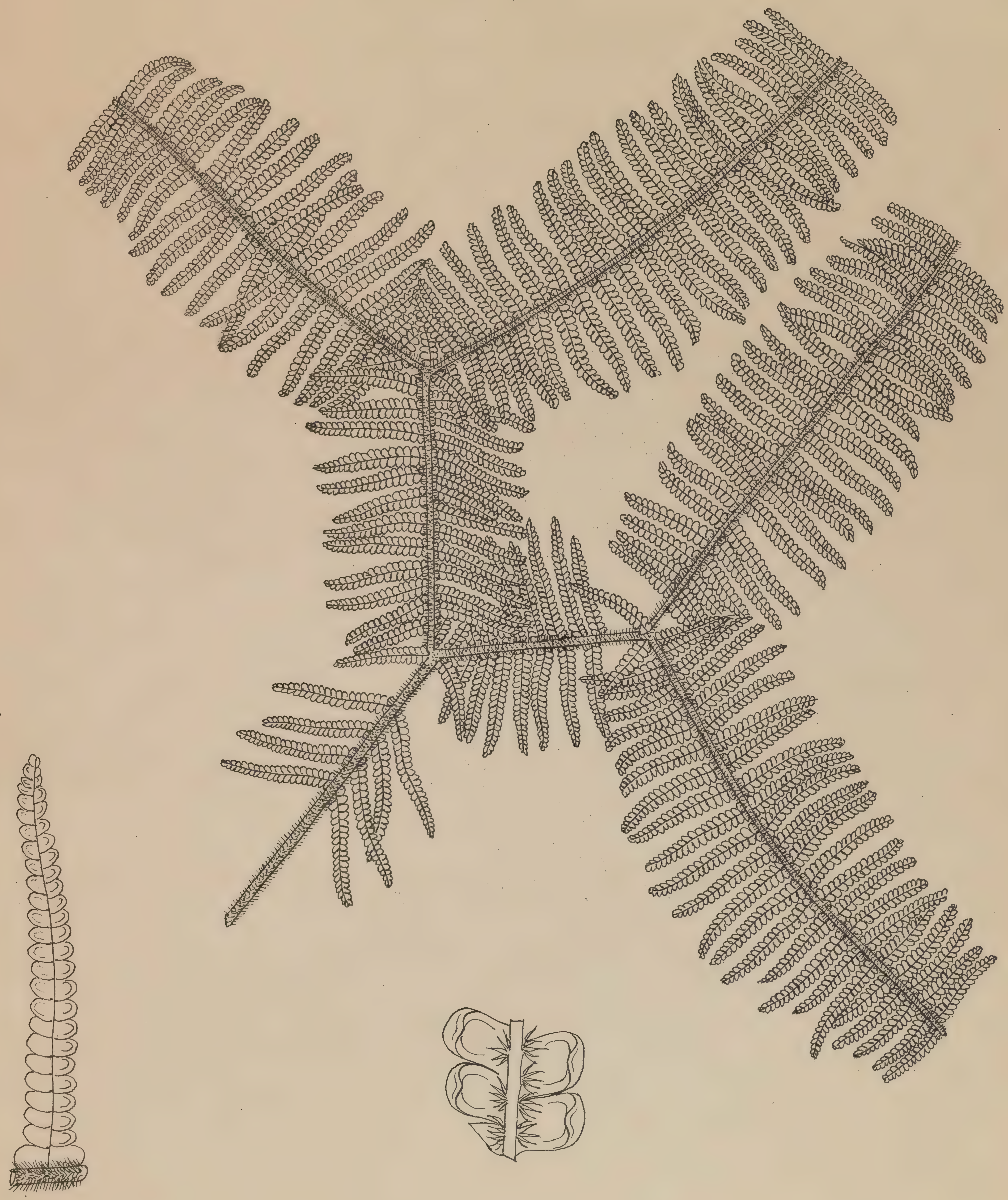
GLEICHENIA. (See "Ferns of Southern India," p. 25.)

GLEICHENIA SEMIVESTITA. (Labill.) Fronds dichotomous divaricated, branches pectinate, pinnæ pinnatifid, segments orbicular ovate slightly concave, branches densely ferrugineo-pubescent, rachis with few stellated hairs, capsules 3-4 exserted. *Labill. Sert. Nov. Caled. p.* 8. *t.* 11. *Hook. Sp. Fil.* 1. *p.* 3.

The figure is taken from Sir W. Hooker's Sp. Fil.

Hab. Malacca, New Caledonia.

PLATE No. CLXXVII.



Gleichenia semivestita
(Labill)

GOVINDOO. DEL.

A. BARREN. LITHOG. MADRAS.

DAVALLIA. (See "Ferns of Southern India," p. 5.)

DAVALLIA TRICHOMANOIDES. (Bl.) Caudex creeping, furnished with narrow linear long-pointed golden scales, fronds subtriplicato-pinnate membranaceous glabrous, pinnæ sub-rhombeo ovate rather remote, pinnules trapezoid oblong deeply pinnatifid, segments narrow cuneato-linear obtuse subbifid, fertile ones truncato-emarginate at the apex with a solitary sorus segments oblong-truncate, rachis margined above and as well as the subtrigonal stipes glabrous. *Bl. En. Fil. Jav. p.* 238 ;—Hook. Sp. Fil. 1. 186.

The specimen figured is from Ceylon, where it has just been detected by Mr. Thwaites. (c. P. 3903.)

Hab. Ceylon, (Adam's Peak on the Saffragam side, elevation 5,000 feet), Mountains of Java ; the Moluccas.

PLATE No. CLXXVIII.

Davallia trichomanoides.
(Bl:)

GOVINDOO. DEL:

A. BARREN, LITHOG, MADRAS.

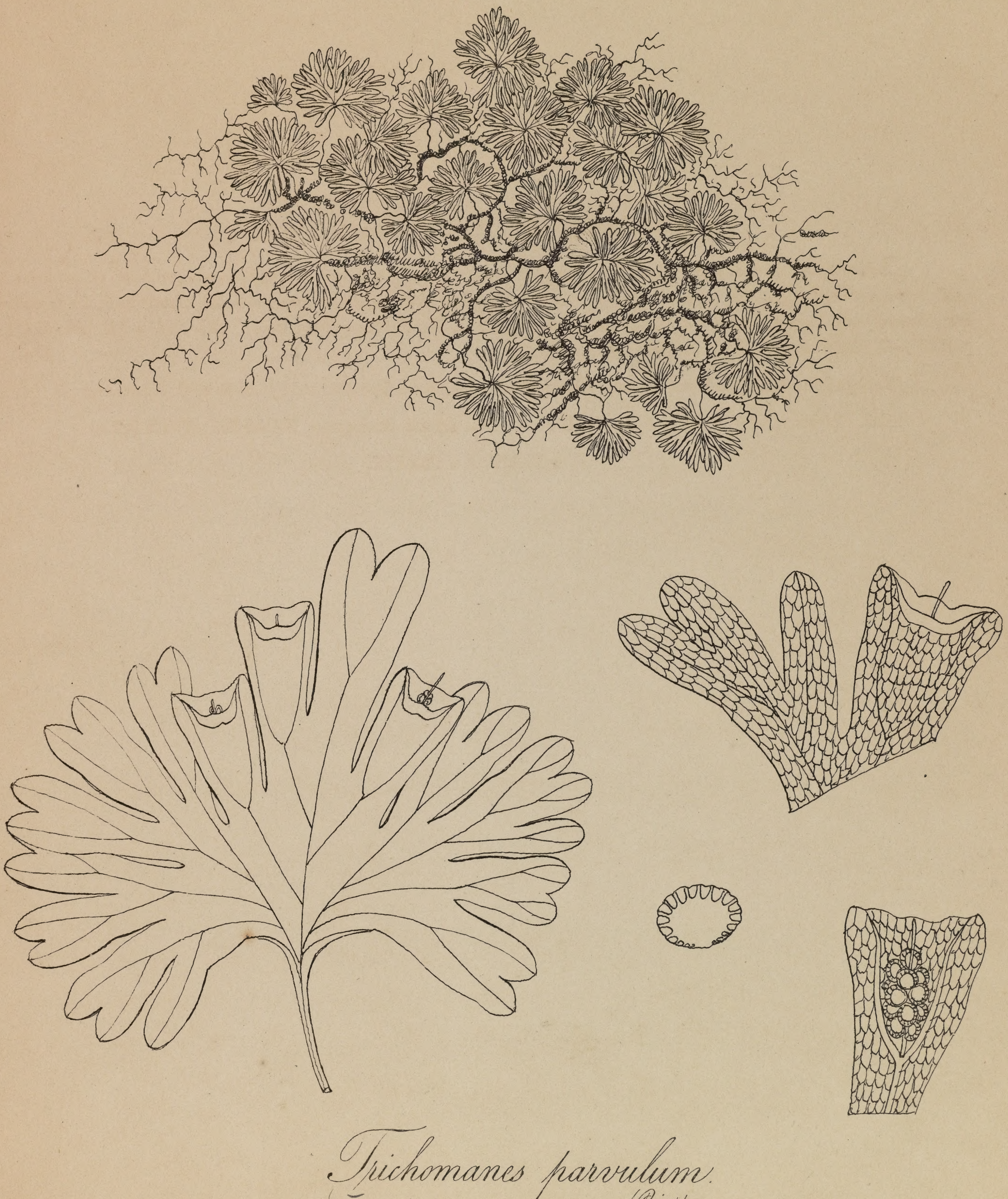
TRICHOMANES. (See " Ferns of Southern India," p. 2.)

TRICHOMANES PARVULUM. (Poir.) Caudex creeping densely matted tomentose, fronds reniform or rotundato-cuneate stipitate inciso-palmate glabrous, segments linear obtuse emarginate or bifid, involucres terminal sunk subturbinate, the mouth spreading obscurely two lipped, receptacles slightly exserted. *Hook. Sp. Fil.* 1. 118 ;—*Poir. encycl. Bot.* viii. *p.* 44. *Bl. En. Fil. Jav. p.* 223 ;—T. Sibthorpioides, *Bory. in Willd. Sp. Pl.* v. *p.* 498.

The specimen figured is from Coonoor (Nilgiri Hills), where it was first detected by the Rev. T. Whitehouse.

Hab. Bourbon, Java, Philippine Islands, Moluccas, New Ireland, Madagascar, Nilgiri Hills (South India.)

PLATE No. CLXXIX.



Trichomanes parvulum. (Poir!)

GOVINDOO DEL: A. BARREN. LITHOG. MADRAS. 1866.

TRICHOMANES.

TRICHOMANES JAVANICUM. (Bl.) Roots long, coarse-descending wiry fibres, stipes and rachis setose, fronds tufted lanceolate rigid (black when dry) pinnated, pinnæ gradually smaller towards the base and apex (the upper ones fertile) sessile or sub-petiolate, oblong, obliquely cuneate at the base, obtuse at the apex, serrate or crenate, with some of the serratures on the lower margin long and bristle-like (formed by excurrent veins) veins generally terminating within the margin but often touching the margin, and ex-current, involucres urceolate, with the mouth entire 2 to 4 on the upper margin of the superior pinnæ which are gradually more and more contracted towards the apex of the frond receptacles very much exserted. *Bl. En. Fil. Jav. p.* 224. *Hook. Sp. Fil.* 1.130 ;—T. rigidum. *Wall. Cat. n.* 161 *not Sw.* ;—T. setigerum *Wall. Cat. n.* 158;—T. rhomboideum. *J. Sm. En. Fil. Philipp.* ;—T. curvatum. *J. Sm ; l. c.* ;—T. àlatum *Bory in Duperrey Voy. Bot. p.* 282. *t.* 38. *f.* 2. *not Sw.*

The specimen figured is from Birmah (Parish)

Hab. Birmah, Chittagong (Dr. Anderson), Java, Singapore, Penang, Malay Islands, Phillippines, Oualan.

PLATE No. CLXXX.

Trichomanes Javanicum. (Bl.)

GOVINDOO DEL. A. BARREN. LITHOG: MADRAS. 1866.